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Journal

203 e. 754





THE KING OF PORTUGAL ON BOARD THE CHALLENGER.

THE CRUISE

OF H.M.S. "CHALLENGER"

"CHALLENGER"

VOYAGES OVER DEEP SEAS,
SCENES IN TROPICAL ZONES.

BY W. L. J. SILLIMAN, R.N.



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WITH MAP AND ILLUSTRATIONS.

NOTES ON THE

CRUISE.

JOHN W. LLOYD, MARSTON STABLE & PRINTING

CROWN BUILDINGS, UPPER EAST END.

1880.

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The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present. The author then proceeds to a detailed examination of the early years of the nation, from the time of the first settlers to the end of the eighteenth century. This section covers the development of the colonies, the struggle for independence, and the formation of the new government. The author also discusses the role of the judiciary in the early years of the nation, and the importance of the Supreme Court in the development of the country.

The second part of the paper discusses the history of the United States from the end of the eighteenth century to the present. This section covers the period of the early republic, the era of the Jeffersonian democracy, the period of the Jacksonian democracy, the Civil War, and the Reconstruction period. The author also discusses the role of the judiciary in the development of the country during this period, and the importance of the Supreme Court in the development of the country.

The third part of the paper discusses the history of the United States from the end of the Reconstruction period to the present. This section covers the period of the Gilded Age, the Progressive Era, the New Deal, and the post-World War II period. The author also discusses the role of the judiciary in the development of the country during this period, and the importance of the Supreme Court in the development of the country.

The fourth part of the paper discusses the history of the United States from the end of the post-World War II period to the present. This section covers the period of the Cold War, the Vietnam War, and the present. The author also discusses the role of the judiciary in the development of the country during this period, and the importance of the Supreme Court in the development of the country.

The fifth part of the paper discusses the history of the United States from the end of the present period to the future. This section covers the period of the future, and the author discusses the role of the judiciary in the development of the country during this period, and the importance of the Supreme Court in the development of the country.

THE CRUISE
OF HER MAJESTY'S SHIP
"CHALLENGER."

*VOYAGES OVER MANY SEAS,
SCENES IN MANY LANDS.*

By W. J. J. SPRY, R.N.



Captain Sir George S. Nares, R.N., K.C.B., F.R.S.

WITH MAP AND ILLUSTRATIONS.

NINTH EDITION.

LONDON:
SAMPSON LOW, MARSTON, SEARLE, & RIVINGTON,
CROWN BUILDINGS, 188, FLEET STREET.
1880.

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LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
STAMFORD STREET AND CHARING CROSS.



P R E F A C E.

THE important objects for which H.M.S. *Challenger* was placed at the disposal of a scientific staff under the direction of Professor Sir Charles Wyville Thompson, F.R.S., the gratifying results obtained by the full investigation of the bed of the ocean, and the vast amount of information gathered by visits to distant lands very rarely explored, render the cruise of the *Challenger* highly interesting and instructive to the British public.

Under these circumstances, I have been induced by numerous friends to revise my daily journals, and publish in a concise and readable form a continuous narrative of this celebrated voyage.

In this volume I shall not in any way interfere with the scientific results, beyond simply naming them in a cursory and general way, leaving to Professor Thompson the task of dealing with these subjects, and the application of the information obtained to the furtherance of physical knowledge.

The description of places visited is given in the way that I have viewed them, and under the impressions that filled my mind at the time; but as the geographical aspects of foreign scenes must be similar by whomsoever observed, it is scarcely possible to avoid occasionally using descriptions almost identical with those published on the subject by previous visitors.

The chief interest connected with this narrative will be the vast extent traversed in the pursuit of knowledge, which admits of the combination in this volume of the general outline of the manners and customs of nations and tribes rarely visited, and descriptions of scenery under every condition of temperature, from the fiery Tropics to the ice-bound Antarctic regions: thus combining in the work a fund of information that has been brought together through special

aid of the Government, granted to the Committee of the Royal Society, and now dedicated to the public use.

I now respectfully present the narrative of the cruise of the *Challenger* to my readers, in the hope that, while affording information and instruction, it will prove of sufficient interest to reward its perusal with some pleasantly passed hours.

WILLIAM J. J. SPRY.

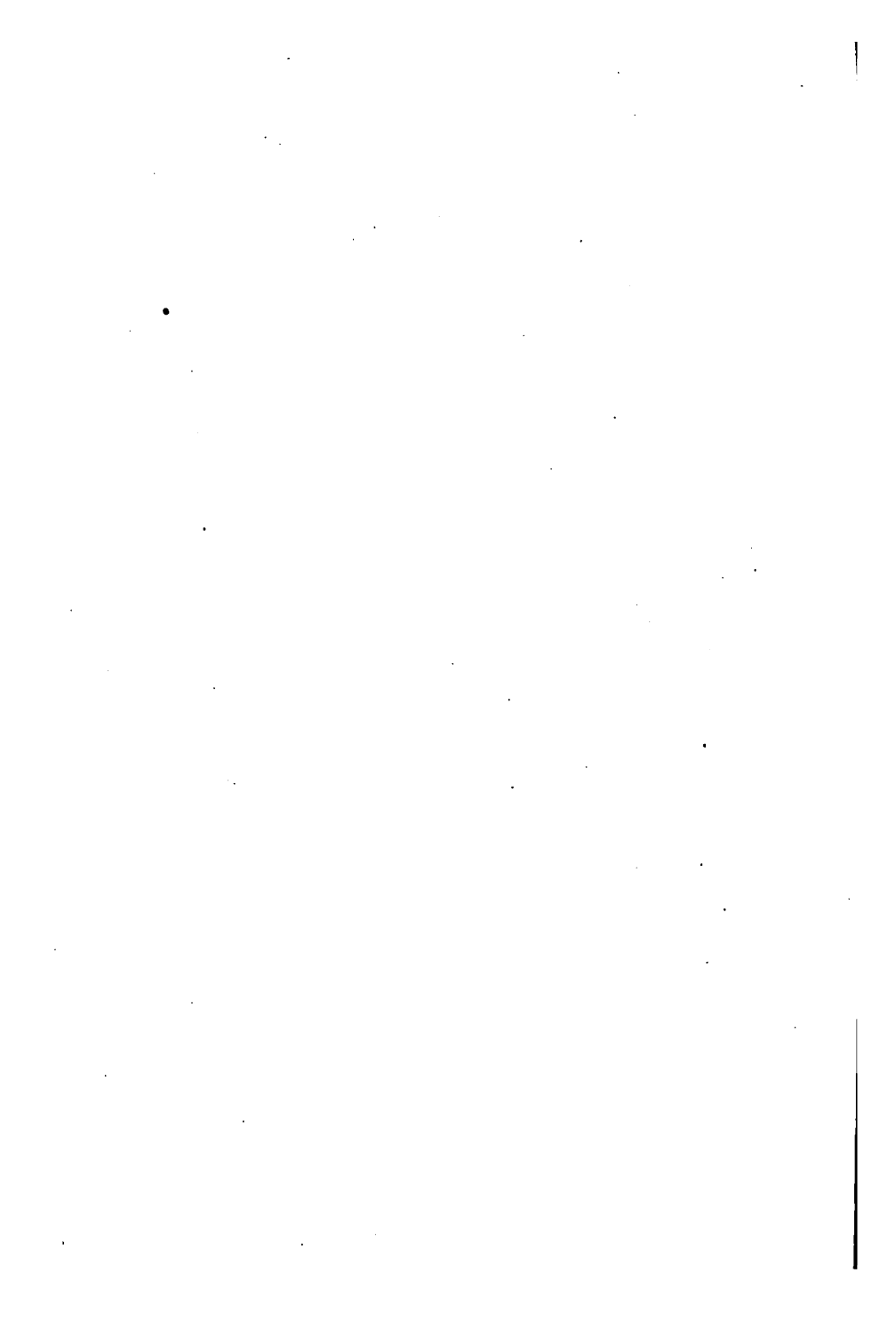
DEVONPORT,
December 1876.

P R E F A C E
TO THE
SEVENTH EDITION.

IN less than twelve months 'The Cruise of H.M.S. *Challenger*' has run through six English editions, has been republished in the United States and Canada, and translated into several continental languages; this speaks for itself, and cannot be other than gratifying to the author. In the present new edition, published at a lower price for a wider public, the text has been carefully revised, considerable new matter added (for which I take this opportunity of thanking most cordially my friend and late ship-mate, Paymaster R. R. Richards), and some of the faults in former editions have been removed in the hope of making the narrative of this now famous voyage still more worthy of the favour with which it has hitherto been received.

WILLIAM J. J. SPRY.

STOKE, DEVONPORT,
September 1878.



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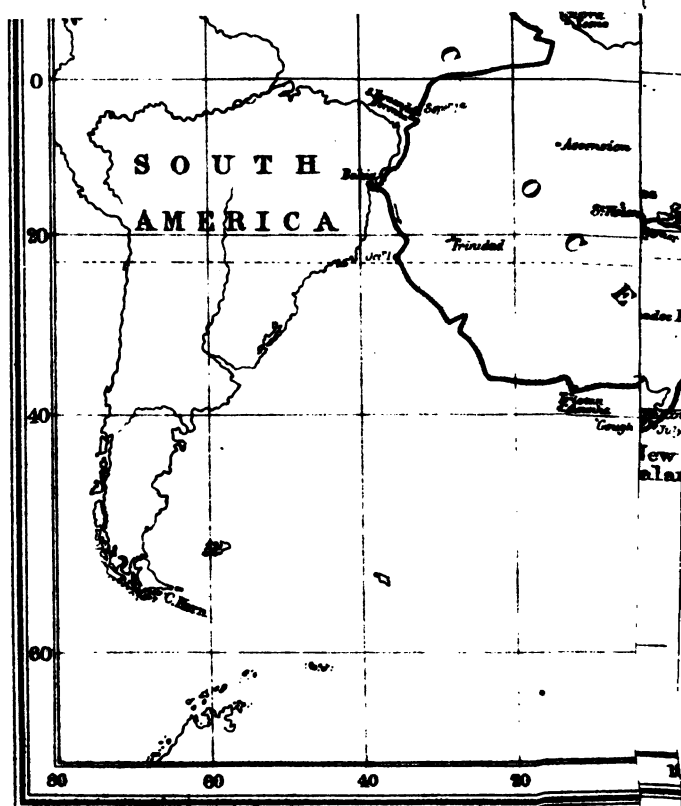
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CRUISE OF H.M.S. CHALLENGER.

INTRODUCTION.

NOT many years ago, in fact within the memory of the present generation, our knowledge of anything below the ocean's surface was extremely indefinite and obscure. It was even asserted that the specific gravity of the water at considerable depths would be so great that any heavy weight thrown into the sea must be arrested, and remain suspended for ever. It was argued that no animal life could possibly exist in the great depths of the ocean; and only some fifteen years ago doubts were entertained whether some starfish brought up by a line from 1200 fathoms had not attached themselves to the line on its downward or upward course, and the very nature and habits of the animal were so modified as to suit this view.

There can be no doubt that the invention of ocean telegraphy first stimulated the great desire as well as the necessity for a knowledge of the contour of the bed of the ocean. To insure success, it was essential to know the configuration and the soundings of the sea, the shape and character of its bed, the nature of the creatures and plants that haunt its depths, the force and set of its currents, the figure and dimensions of the great ocean basins, and the temperature of the water at various depths.

Interesting as were the results of the various early sounding expeditions, it was not until 1868 that anything like a systematic examination of the ocean's bed was undertaken in connection with natural history and physical geography. In that year the Royal Society succeeded in getting H.M.S. *Lightning* placed at their disposal for some six weeks; and though for so brief a period, the results were such as to give great encouragement for further investigation. Although no great depth of water was obtained in sounding, dredging was effected in 650 fathoms, a greater depth than had hitherto been attempted. The next year (1869) the

Council of the Royal Society were successful in securing H.M.S. *Porcupine*, which was fitted out for a more extended exploration of the deep sea; and the experience of the previous year was brought to bear on the improvement of the means for the purpose in view.

The first cruise was between the latitudes of Cape Clear and Galway, on the west coast of Ireland, where a series of soundings and dredgings were effected in 1500 fathoms (more than double that of the previous year), and many creatures of great interest obtained.

The second part of this cruise extended to the south and west coast of Ireland, where a depth of 2400 fathoms was reached with successful results; and the third part extended over some portion of the survey of the previous year (between the coast of Scotland and the Farøe Islands). On the termination of this voyage (taking into account the time occupied and the extent of the investigations), the cruise of the *Porcupine* was considered to have done more to advance our knowledge of the physical condition of the ocean than had been achieved by any former expedition that ever left our shores.

In 1870 the *Porcupine* was again engaged in the service of the Council of the Royal Society, and proceeded at first in a south-westerly direction towards the farthest point to which the survey extended the year before, and afterwards to the coast of Portugal, and to Gibraltar, where a vast quantity of interesting and important data was obtained. In addition to the sounding and dredging, thermometric observations were constantly taken, proving even more successful than those obtained during the previous voyages. The results showed unsuspected variations in the deep-sea temperature, the existence of a general oceanic circulation, and the presence of life at the greatest depths. The scientific and practical importance of the facts revealed by these short and imperfect inquiries was such as to render their continuance a matter of national concern: so much so that the Council of the Royal Society brought before the Government a project for extended investigation, which was eventually approved of, and a committee appointed to prepare the plans of operation.

It was suggested that a vessel should be fitted out for a three or four years' cruise, during which time sounding, dredging, thermometric observation, and chemical examination of sea-water, should be carried on continuously, with a view to a more perfect knowledge of the physical and biological conditions of the great ocean basins, of the direction and velocity of the great drifts and currents, of the faunæ of the deep water, and of the zoology and botany of those portions of the globe which are at present comparatively unknown.

H.M.S. *Challenger*, a spar-decked corvette of 2000 tons displacement, and 4000 horse-power, was selected to carry out these recommendations; and the necessary alterations to fit her for the service on which she was to be employed were made in the dockyard at Sheerness. With the exception of two 64-pounders, all the guns on the main deck were removed so as to obtain the required accommodation. In addition to cabins for the Captain, Commander, and Director of the Scientific Staff, there were spacious compartments for surveying operations and analysing purposes, a laboratory for the chemist, and a studio for the photographer, all fitted with every appliance which skill and science could suggest. On the upper deck stood an 18-horse double-cylinder engine, with shafting and drums extending entirely across the ship, for heaving in the dredging and sounding lines; and on the after part of the deck, besides the usual standard and other compasses, was the Fox dipping-circle, with which it was intended to make an extensive daily series of magnetic observations.

From the Hydrographic Department at the Admiralty a code of instructions was issued, regulating the daily routine to be carried out whenever the weather and other circumstances permitted. The *Challenger*, after visiting Lisbon, Gibraltar, and Madeira, was to proceed across the Atlantic, through the trade-wind region, to the Virgin Islands; thence to Bermuda, onward to the coast of North America; and eastward again to the Azores, and thence to the Canaries, Cape de Verde, and to the equatorial regions—which were to be thoroughly investigated—westward to St. Paul's Rocks, Fernando de Noronha, and to the coast of Brazil. After leaving Bahia, it was desirable that the island of Trinidad, Martin Vaz, and Tristan d'Acunha should be visited on the passage across the South Atlantic to the Cape of Good Hope, which it was expected would be reached at the close of 1873.

From the Cape it was proposed to examine the small groups of islands of Marion and Crozet, and to visit Kerguelen Land; from which the Expedition was directed to proceed as far south as safety would permit in the neighbourhood of the Antarctic ice-barrier, and after a short survey to sail for Melbourne, Sydney, and the ports of New Zealand. If time and other circumstances would permit, it was intended again to proceed south, for the purpose of visiting the small islands of Campbell, Macquarie, Auckland, &c.; then again north, sailing to Friendly and Fiji Islands, onward through the Coral Sea; visiting the south coast of New Guinea, passing Torres Straits and the Arafura Sea, calling at Timor and Macassar, thence

shaping our course through the Celebes and Lulu Seas to Manilla, which would probably be reached in November 1874.

From Manilla the *Challenger* was directed to sail eastward into the Pacific, calling at those little frequented regions, the Pelew Islands, New Britain, New Ireland, and the Solomon group, *en route* for Japan.

After leaving Japan, a course was to be taken across the Northern Pacific to Vancouver's Island, and thence southward through the eastern trough of the great ocean to Valparaiso, calling at Easter Island and Sala y Gomez. On leaving Valparaiso, it was proposed to return to the Atlantic through the Straits of Magellan, and by Rio Janeiro and St. Helena to England, which would probably be reached early in 1876. The globe will thus have been circumnavigated, and the great oceans traversed from north to south, and from east to west. How far this programme was carried out will be seen by the following chapters.



THE CITY OF LISBON, FROM THE TAGUS.

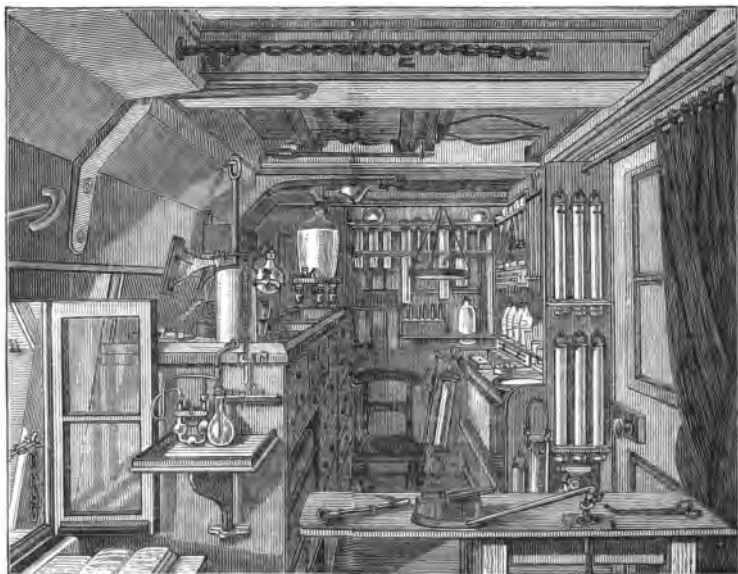
CHAPTER I.

ENGLAND TO LISBON AND GIBRALTAR.

H.M.S. Challenger commissioned at Sheerness—Objects of the Voyage—Equipment and fittings—Leave Sheerness—The stormy passage—Arrive at Portsmouth—Commencement of the voyage—Leaving England—Weather in the Channel—Across the Bay of Biscay—First sounding and dredging—The results—Land in sight—Enter the Tagus—Anchor off the city of Lisbon—Visit the shore—Sight-seeing—Church at Belem—Churches, gardens, and palaces—Early history of Portugal—Visit of King Luiz to the *Challenger*—Leave Lisbon—Dredging off Cape St. Vincent—First trial with the trawl—Venus's flower-baskets—Description—Trawling near Gibraltar—Obtain specimens of the Umbellularia—Their description—Pass Cape Trafalgar—Rock of Gibraltar in sight—Arrive, and secure alongside the Mole—Sights of Gibraltar—Galleries through the rocks—Stalactite caves—Gibraltar as a military fortress—Ceremony of opening and closing the gates—The naval establishment—The town—Its churches—Garrison library—The Alameda—Neutral Ground—Campa and San Roque.

H.M.S. CHALLENGER was placed in commission at Sheerness, on the 15th November 1872, for the purpose of proceeding upon a voyage of scientific discovery and deep-sea exploration in the Atlantic,

Indian, and Pacific Oceans, descending into the Southern or Antarctic Ocean as far as the ice would permit. For some months previous to the date of her commission, she had been in the hands of the dockyard officials, undergoing great changes both in equipment and internal accommodation, so as to fit her with every possible means for furthering the great work in hand. For the use of the scientific staff, of which Professor Wyville Thomson was the director, there was built an ample and compact work-room, con-



CHEMICAL LABORATORY ON BOARD THE CHALLENGER.

taining numerous drawers and receptacles fitted with bottles and jars for holding specimens of organic ocean life, and a well-stocked library of professional books in various languages.

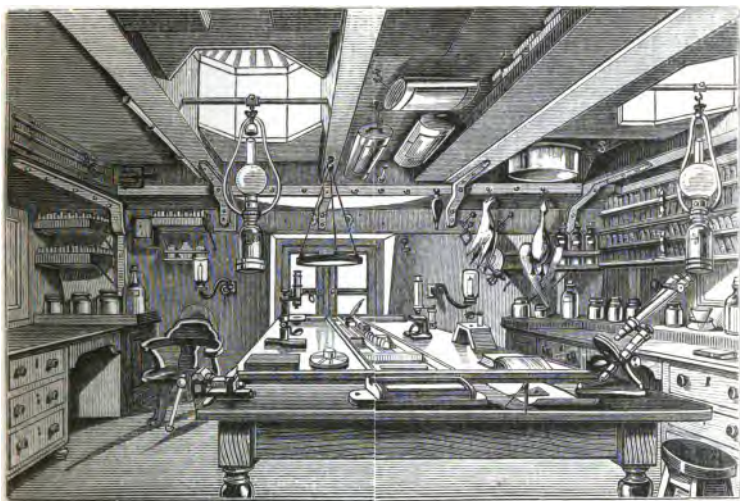
Here also were provided numerous instruments for dissection and microscopic observation, long tubes for preserving rare specimens, harpoons, and many ingenious devices for entrapping and securing larger game than the dredge could possibly furnish.

On the opposite side of the deck, and somewhat farther forward, was placed the chemical laboratory for the purpose of analysing and

testing the sea-water obtained from the different depths: here were ranged retorts, stills, tubes of all sizes, hydrometers, thermometers, blow-pipes—in fact, all the usual paraphernalia found in laboratories; chemicals in drawers, and jars in racks; all secured from accident from the rolling of the ship by many ingenious devices.

The photographic quarters faced the laboratory, and consisted of a dark room and studio, where were ranged the bottles, chemicals, and apparatus required by the operator.

A large aquarium was near at hand; while the water bottles and



NATURALISTS' WORK-ROOM ON BOARD THE CHALLENGER.

sounding-machines were secured close by in racks against the ship's side.

On large reels were coils of telegraph insulated wire, for the purpose of obtaining the temperature at different depths by galvanic influence.

Secondly, but not less in importance to the duties of the scientific staff, were those of the naval surveying officers, at the head of whom was Captain G. S. Nares, distinguished as a surveyor for years past. For the use of the officers under his direction, there was, opposite the naturalists' department, a spacious chart-room, for the purpose of laying down surveys and constructing diagrams and sections of

the ocean's bed over which the vessel travelled on her voyage round the world.

The direction of this great expedition was given into hands thoroughly well qualified for the responsibilities imposed upon them.

The naval officers were selected, for some special acquirements, by the Admiralty; and the staff of civilian naturalists and physicists were nominated by a specially appointed committee of the Royal Society, who also furnished instructions and suggestions for the work.

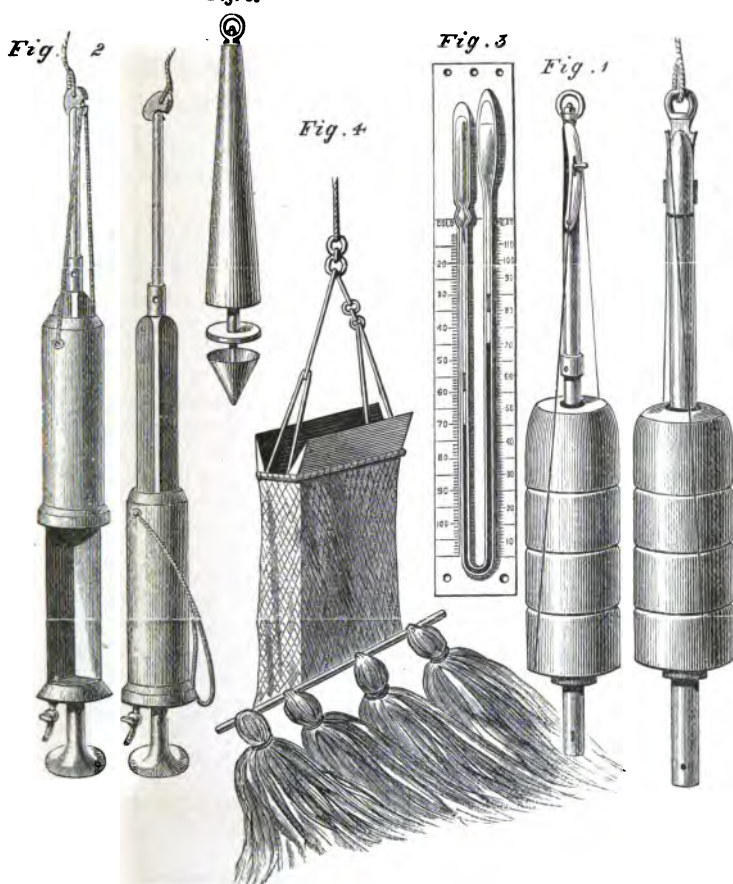
At this wretched sea-port, amidst rain and heavy gales, the ship was completed for sea, and, after entertaining the leading members of the Royal Society and the heads of the naval department on board, inspection by the naval Commander-in-chief, swinging ship for the adjustment of compasses and magnetic instruments, H.M.S. *Challenger* steamed out of Sheerness harbour on Saturday, the 7th December, with indications of favourable weather, although our hopes for a continuance were damped by a signal made before clear of the harbour that gales were reported off Dover. Heavy weather indeed we found it. The storm of the next day (Sunday) is a matter of history, and the ship rolled and pitched to a fearful extent. Monday afternoon Deal was reached, and most of the scientific staff landed, preferring a land journey to Portsmouth. The next day a second attempt was made, and finally, after experiencing another heavy gale, the quiet waters of Portsmouth harbour were reached, and the *Challenger* made fast to the Dockyard jetty. The wet weather of Sheerness had followed us and interfered greatly with comfort and cleanliness. Here a fortnight was spent in completing supplies, and bale after bale, and box after box were being daily brought on board, taxing the ingenuity of those whose duty it was to stow them away in safety and security, until one wondered if the holds and store-rooms were not indeed scientifically constructed of some elastic material so as to stretch to any size.

On the 21st December all was pronounced ready, and the most important surveying expedition which had ever sailed from any country left Portsmouth harbour. As the day advanced, in our progress down Channel, we fell in with miserable, stormy weather, which was our accompaniment for some time. Thus we left our native shores. The sensations were indeed painful; parting from home, with all its pleasing associations, and cherished recollections, had a powerful influence, and gave rise to melancholy impressions, happily relieved by the comforting hope that we should one day be permitted to return to all those so dear to us.

The weather continuing of the same wild and stormy character as

we crossed the Bay of Biscay, it was not until the 30th December, nine days after leaving England, that an opportunity presented

Fig. 5.



SOUNDING AND DREDGING APPARATUS.

Fig. 1. Sounding-machines. **Fig. 2.** Slip water-bottle. **Fig. 3.** Deep-sea thermometer. **Fig. 4.** The dredge. **Fig. 5.** Cup sounding-lead.

itself of commencing scientific work. When we were about 40 miles west of Vigo Bay, our first sounding was obtained at a depth of

1125 fathoms, the bottom being *Globigerina* ooze. After this the dredge was put over and lowered to the bottom, where it was allowed to remain some hours, the vessel slowly drifting onward. On hauling in, it was found turned upside-down, and in a lovely tangle. A second attempt was made, and a few specimens were brought up, one a rare fish, and some others of scientific value, enough to compensate for the dissatisfaction of the first failure.

Dredging was resumed on the 2nd January, but with no better results, for the dredge fouled the bottom, and eventually the rope parted and some 3000 fathoms were lost.

The next day we steamed in for the land, the weather being much finer as we approached the coast, passing on our way between the rocky islands of the Burlings and Cape Carvoeiro, on the mainland, sighting the village of Peniche, with its numerous windmills and small houses scattered about, which have a very pleasing effect. We passed sufficiently near to get a capital view of the dark frowning cliffs which sweep round the sandy beach, named by the residents the *Praia Formosa*, or Beautiful Beach, from its shelving sands.

Happily our troubles were over for a time. Clearing Cape Roca and the beautiful heights of Cintra, we steamed slowly up the Tagus; past the straggling suburb of Lisbon, with its many-coloured villas scattered over the slopes; past the wonderful castle of Belem, with its elegant proportions and rich ornaments, recording the skill and the refined taste of the old master masons.

About mid-day we moored in the Tagus, off the capital, and all who desired started for a run on shore. Some went to Cintra; while others spent the time in seeing what was most interesting in the city and its immediate neighbourhood, or in resting after the knocking about experienced in our passage from England.

There are many buildings and places of interest to be seen; perhaps the monastery and church of Belem, of Gothic-Moresque architecture, is worth mentioning; no one could pass it without gazing on the beautiful porch, which is rich beyond description in carvings. Up to the very roof of the church, every pinnacle and buttress, and even the flat portions of the wall, are encrusted with ornaments.

On entering, the interior is of a most charming nature. There seems no excess of ornament, and the delicate shafts of pale grey marble support a wonderfully carved and fretted Gothic roof, with all the effective airiness of Moorish architecture. Service happened to be proceeding during my visit. The church was cool and dim, and the clear sweet voices of the choristers rose and fell along the

aisle, and seemed to linger in the roof among the sculptured palm-leaves.

The high altar, with its lighted candles and vases of flowers, and the rich robes of the officiating priests, formed a warm patch of colour strongly in contrast with the cold simplicity of the grey marble.

The monastery of Santa Maria—commonly called the monastery of St. Jeronimo, from its having been occupied by monks of that order—is in connection with the church, and was founded with it in 1499 by King Manoel the Fortunate, in commemoration of the discovery of the Indies, on the spot where Vasco de Gama embarked on his first eastern voyage.

Church, gardens, and palaces are scattered about, all well worthy of a visit; for there was a time when this country was amongst the foremost in the world. When in the full tide of its prosperous colonisation (A.D. 1500), it was from this port that the great Vasco de Gama sailed to the Cape of Good Hope, which had been previously discovered by Bartholomeo Diaz in 1487; and on a second occasion visited India. Lope Luares Francisco de Almeida followed with ships and men, conquered the Maldives, and established factories in Ceylon, Malacca, Sumatra, when the greater portion of the Eastern Archipelago was in the hands of the Portuguese. Trading relations were opened up with Pegu and Burmah, China and Japan, such as have only recently been granted us. In fact, no flag but theirs could fly along the whole African coast. No ship, without their permission, dared anchor in any harbour from Gibraltar to Abyssinia, from Ormuz to Siam. But in fifty-seven years—that is, at the end of the reign of King John III., in 1557—began the great change. Misgovernment, tyranny, and the work of the Jesuits and the Inquisition strangled the rising fortune of this little kingdom. From that day up to the present, matters have seemingly been going from bad to worse, and now, stripped of nearly all its colonies, Portugal is indeed but a wreck of what it was in the sixteenth century, when England could not have disputed the possession of an inch of ground with her for a week. England now wears the mantle Portugal in her blindness and bigotry let fall.

Before we left Lisbon, his Majesty King Luiz I., who is known to be very fond of natural history, &c., did us the honour to visit the ship, and remained on board for some considerable time, showing the greatest interest in the captures which had been made on the passage from England.

Other matters were at the same time fully explained by Captain Nares and Professor Thomson, sufficient to enable him to thoroughly

comprehend the object of the Expedition, also showing him each department in full working order. After luncheon, and previous to his departure, a group photograph was taken of his Majesty and the officers of the Expedition.

We were detained here until the 12th by a heavy gale from the south-west. On its moderating, we steamed out of the Tagus, and the next day dredged in 470 fathoms off Setubal. The bottom was of the ordinary grey ooze of the Atlantic. The gale had blown over, and we experienced light easterly and northerly winds, which enabled us to get a few successful hauls with the dredge, and soundings between the coast in the neighbourhood of Lisbon and the deep water to the south-west in the direction of Madeira: the incline was found to slope gently down to 1475 fathoms, with a muddy bottom at 31 miles distant from the shore.

When a little to the south of Cape St. Vincent, it was proposed to try the common trawl, and one with a 15-foot beam was lowered in 600 fathoms; it went down all right, and, after being towed for some hours, was drawn in just as easily as the dredge.

There was no lack of living things, strange-looking fish with their eyes blown nearly out of their head by the expansion of the air in their air-bladders, while entangled amongst the meshes were many starfish and delicate zoophytes shining with a vivid phosphorescent light. On another occasion of using the trawl, an object of very great interest was brought to light, and afforded an opportunity of seeing one of those highly prized and beautiful specimens of the Euplectella, or Venus's flower-basket, alive.* It is an object most beautiful in form and structure, consisting of a slightly curved conical tube 8 or 10 inches in height, contracted beneath to a blunt point, and expanded above to the width of about 2 inches. The walls are of the most delicate tissue, recalling spun glass, and resembling finest transparent lace, or rather Shetland wool work. The lower end is surrounded by an upturned fringe of long, lustrous, glassy fibres, and the wide end, after giving off from its edge a fluted lacy frill, is closed by a delicate lid of open network. Hitherto these beautiful objects have only been obtained from the seas of the Philippine Islands, where they live buried in the mud at the depth of 100 fathoms; so the specimen now secured was considered a most interesting addition to the fauna of Europe.

Our last cast of the trawl before reaching Gibraltar was to the depth of 2125 fathoms; the result was very satisfactory. A number of things came up—starfish mainly, and holothurids; but among

* Professor Thomson, in 'Good Words.'

them was one species of great interest, historical as well as zoological, the clustered sea-polyp, *Umbellularia Grœnlandica*; twelve gigantic alcyonarian polyps, each with eight long fringed arms terminating in a close cluster on a stem 3 feet high. Two specimens of this fine species were brought from the coast of Greenland early in the last century; somehow these were lost, and for a century the animal was never seen. A year or two since two were taken by the Swedish scientific expedition, and this obtained by us must be considered as the third specimen of this rare marine animal.

On the evening of the 17th January we passed Cape Trafalgar, and sighted the light of Tarifa. At sunrise the next morning we were close under the Rock of Gibraltar, rising barren grey and gloomy before us. Shortly after we came anchor and later in the day proceeded alongside the New Mole to complete with stores.

This remarkable promontory, the Calpe of the ancients, constituted of old, with the opposite Abyla, or Apes' Hill, the boundary of the then known world.

Gibraltar was strongly fortified when it belonged to Spain, but its greatest and grandest works date from the Treaty of Utrecht (1713), when it became attached to England. Stupendous and incomparable are the works which since that period have been executed on it. Excellent and well-kept roads lead to the principal fortifications, which begin at an elevation of only a few hundred yards above the town.

The galleries hewn in the solid rock, forming a kind of casemate, have been constructed at an immense expense of labour and money. Their extent is over a mile in length; and besides these galleries, passages run for miles in the interior of the Rock, affording the garrison a thoroughly protected connection with all points that might be at any time threatened.

The grandest and most imposing of these marvellous excavations are the Queen's Gallery and St. George's Hall, which, according to carved inscriptions, were mostly begun and completed between the years 1783 and 1789. At the period of our visit (1873), there were about 1800 guns mounted on the different fortifications. From the fortification a narrow and rather steep path leads to the Signal Station, at an elevation of 1300 feet above the level of the sea, where a sergeant of the Royal Artillery is placed in charge. From this point an excellent view is obtained of the blue waters of the Mediterranean, and the many charming Spanish villages on the western shore of the bay.

On the road down are to be seen some remarkable calcareous caves.

That of St. Michael's is situated at a height of 800 feet above sea-level. It contains beautiful stalactite formations, and seems to be of considerable extent. It is somewhat difficult to get about in its intricacies, but one is well repaid for the trouble. On the south-east side of the Rock is another of these caves, dedicated to St. Martin; it is smaller, but the stalactites are of a purer whiteness. Here we discovered a large accumulation of sand, recent shells, and many heaps of bones and teeth of large herbivorous animals, which possibly existed here ages ago, when Gibraltar, instead of having its present salubrious climate, was covered with icy peaks and glacial boulders.

Gibraltar has little save its barracks, military storehouses, and fortifications to attract strangers; in fact, within the gates it may be considered merely a large garrison.

The opening and closing of the gates is daily carried out with a certain amount of ceremony, as if in a state of siege. Immediately after sunrise the sergeant of the guard procures the keys of the gates, which have been deposited at the Governor's the night before, when, accompanied by a guard with rifles and fixed bayonets, he has the gates opened, and the drawbridge lowered; and throughout the day visitors are free to come and go; those from Spanish possessions having a pass which is "viséd."

Every evening, soon after sunset, the ceremony is repeated. The sergeant, accompanied by his escort, carrying a heavy bunch of keys, marches to the various town gates, the bridges are drawn up, the gates closed, bolted, and locked, and from this hour none can enter or leave the town, for the keys are returned to the Governor.

The Naval Yard is a compact and excellent establishment, where defects to the hull and machinery of vessels on this part of the station are well attended to. Stores of all descriptions are to be obtained, and large quantities of coal, some 10,000 or 15,000 tons, are usually on hand.

The town, which is built on terraces on the side of the Rock, gives shelter to some 15,000 souls, consisting of Spaniards, English, Italians, Portuguese, Moors, Turks, Greeks, and Jews; indeed, a mixture of races, customs, and manners, such as can scarcely be found at any other place in Europe.

There are several churches, chapels, and synagogues, a couple of excellent hotels, and numbers of other houses for refreshment; shops for the sale of Moorish curiosities, Maltese lace and filigree jewellery, cigars and tobacco. Being a free port, there are no custom duties (except on wines and spirits); consequently most things are so cheap as to induce smugglers to carry on an extensive trade with Spain,

which country still persists in maintaining her prohibitory duties on English goods.

I must not omit to mention the Garrison Library, nor the kindness and cordiality of the military, who invariably, on the arrival of a man-of-war, take the earliest opportunity of acquainting the officers that during their stay in port they are to consider themselves honorary members. Many a pleasant hour may be passed in this resort, with its thousands of volumes; for although amongst this vast collection there are many rare and costly works, especially of ancient Spanish literature, all the newest and most important books and magazines of the day are being constantly added. Add to these late newspapers, periodicals, and daily telegrams from England, and some notion may be formed of the value of the Garrison Library at Gibraltar. It was founded in 1793 by Captain Drinkwater, and is one of the finest and most imposing buildings on the Rock.

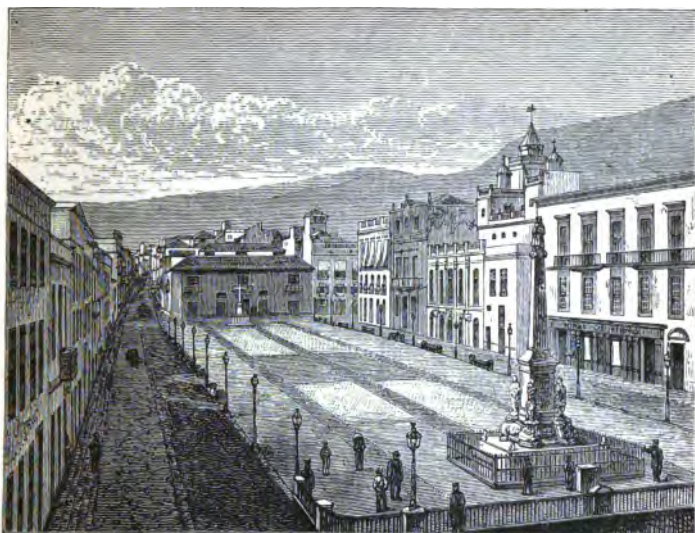
There are several pleasant walks about the town, but perhaps the best is in the Alameda, or Elliott Garden, situated at the south end; it is prettily laid out, and in commemoration of the heroic defender, General Elliott (afterwards Lord Heathfield), a bronze bust on a column has been erected to his memory. Plants of different sorts—semi-tropical cacti, dwarf palm, Spanish broom, the yellow blossoms of which are mixed with the varied colours of fuchsia, orange, and oleanders—render it a most charming promenade, and during the fine evenings military band performances take place, when it is usually thronged with visitors. Continuing our walk farther south, we passed the dockyard convict establishment, and barracks, and on the lowest terrace, which juts farthest into the sea, came upon the lighthouse on the celebrated Europa Point.

On the north end of the Rock is the sandy neck of land called by the Spaniards "El Istmo," and by the English the "Neutral Ground." It runs between the Mediterranean and the Bay, and is about $1\frac{1}{2}$ mile in length and 2700 feet in width. This plain, which is not more than 10 feet above the level of the sea, owes its origin to the formation of a dune in the rocky bed of the ocean. Strong easterly gales seem by degrees to have accumulated the sand on this shallow run of the sea, which formerly separated Gibraltar from Spain. Until quite recently the inhabitants were almost entirely dependent for water on that collected from rain in tanks. Artesian wells, however, have been sunk on the Neutral Ground, and now yield an extensive supply of excellent, pure water.

On the east side of the Rock, near Catalan Bay, there is a sand formation similar to that on the Neutral Ground; this deposit has

attained the enormous height of 1000 feet. There is no road round this side, for a portion of the sand has been excavated at the point where the isthmus joins the Rock, and the water of the bay flows in so as to leave only a narrow low dyke of firm ground.

The adjacent Spanish settlements of C  mpamiento and San Roque are much resorted to by excursionists from Gibraltar, and during the summer months are selected by numerous families for a prolonged stay. However little pleasure or interest a ride over this arid and sandy plain affords, when once arrived at Campo, the rider enjoys a most charming prospect, as there is probably no other point from which the isolated Rock appears more grand or picturesque than from this neat little village.



PLAZA CONSTITUCIÓN, SANTA CRUZ, TENERIFFE.

CHAPTER II.

GIBRALTAR TO MADEIRA AND TENERIFFE (CANARY ISLANDS).

Leave Gibraltar—Daily sounding and trawling—Sight Porto Santo—Its discovery and early history—Arrive and anchor in Funchal Bay, Madeira—Its early history—First impressions—The gardens, buildings, conveyances, dress—Leave Madeira—Pass the Desertas—Cape Anaga—Teneriffe sighted—The Peak—Anchor off Santa Cruz—The buildings and streets—Scenery in the country—Ascent of the Peak—Cruising amongst the group—Sounding and dredging—Ball at the English Consulate—Naval incidents connected with Teneriffe.

WHILE at Gibraltar, a new survey was made of the inner mole, the ship's chronometer rated, and magnetic observations obtained. On the 26th January we left the anchorage, and proceeded round Europa Point, and, as the day was well advanced, hastened on so as to get through the Straits before dark. After passing the Pillars of Hercules, the wind freshened considerably, and the intention of making a short detour from our course so as to visit Tangiers had to be abandoned. Early next morning we passed the most

southerly point of Europe, and as we steamed on, we gradually lost sight of the coast, which was beautifully illuminated by the rising sun, affording us the last glimpse of the Old World.

A westerly course was now shaped to continue the line of soundings we had dropped off Lisbon. Deep water, with a soft oozy bottom, was found to exist, favourable for telegraph cables; and day by day, as the weather moderated, so the dredging and trawling became more successful, and a number of strange new forms of animal life were found: some wondrous formation of sea-urchins and lily-stars, some clustered sea-polyp of singular beauty and of great scientific interest. Thus a week passed, and, on the 2nd February, Porto Santo was sighted—a barren, rocky spot, but, as its name (Holy Port) indicates, viewed by its first tempest-tossed discoverers with thankful hearts when, in their attempt to circumnavigate Africa, they were driven out to sea and on the point of perishing.

The island, when first discovered (1416), was, according to some accounts, inhabited, according to others desolate; however, the voyagers were so delighted with the discovery that it was resolved to discontinue the search along the African coast, and to return to Portugal with their present acquisition of knowledge, and with the evidences of their success. Prince Henry, who had been the means of fitting out the expedition, was so delighted with the account of this first discovery that he immediately planned a scheme of colonisation. Vessels left Lisbon with a number of labourers fitted out for settling, who had been persuaded to go by tempting inducements, and who carried with them a varied stock of domestic animals, and all kinds of grains and plants suitable for cultivation. This expedition was placed in charge of Bartholomeu Perestrelo, who was also appointed governor of the island. Thus was the father-in-law of Columbus engaged in the important pioneer work of discovery. He was the first coloniser and planter in newly discovered western ocean lands.

But Perestrelo failed in the cultivation, and after three years abandoned the governorship which had been vested in him. Some short time afterwards, Columbus with his wife Philippa came here to reside, in order to get a living out of the wild property bequeathed to him by his father-in-law. But he gained nothing by it, unless, perhaps, some increase of knowledge, and the birth of his son Diego in Porto Santo.

We remained for a short time sounding and dredging in the vicinity of Porto Santo, which appears, on nearing it, like two

islands. As we passed to the eastward, the southern coast presented a most conspicuous and pleasing aspect, giving an impression of the place which probably would hardly be borne out on landing and making a closer acquaintance.

The next morning we were off the anchorage in the Bay of Funchal (Madeira). This lovely and fertile island was discovered soon after Porto Santo, and from its dense forests at that time received this Portuguese name for wood. It had, no doubt, a people and name of its own, but they have passed away, and the footsteps of the civilised discoverer have obliterated every trace of the aborigines. The first act of the adventurers was to set fire to the dense forests, which fed a conflagration that was not fairly extinguished for many years; and when the virgin soil of the land was fully exposed, colonisation was successfully established.

This colony of Madeira was the nursery of two notable things of momentous consequence in the history of all subsequently discovered and colonised western countries. One was the introduction into the island of some growing shoots of a plant obtained by Prince Henry in Sicily, but originally brought from South-Eastern Asia, and spoken of by an old Biblical prophet as the "sweet cane from a far country." Here, then, was organised and established the first sugar-cane plantation, and such was its success that, after about five years' experience, 60,000 arobas of sugar were sent to Lisbon. This formed only 20 per cent. of the annual produce of the island, and was reserved as the especial revenue of the Military Order of Christ, of which Prince Henry was grandmaster.

The other notable matter was the labour by which this sugar-cane was so abundantly produced. It was found from the first that Portuguese agriculturists would not voluntarily exile themselves; so recourse was had to the negroes, who were imported in large numbers from Africa. These negroes, who had, as we know, been toiling involuntarily ages upon ages in Asia, were now for the first time employed by Europeans in extracting wealth out of the new lands of the West.

On the morning of February 3rd we arrived and anchored in Funchal Bay, just to the south of the Loo Rock, the only place of shelter at this season of the year, the open roadstead affording but little protection against the prevailing winds. The weather was fortunately very fine, and we were enabled to coal in safety. Coming in from the monotonous sea, the first impressions of Funchal are delightful and striking, with its luxuriant gardens smiling with gorgeous flowers, and its mountain-sides cultivated almost to their summits with beautiful plants. Nature exhibits herself here with

such varied charms that imagination can scarcely picture a lovelier scene.

I had a ramble on shore through some of the gardens, and although flowers were not exactly in full bloom, yet some of the most beautiful plants were in their highest development. Amongst others were seen sweet-smelling rose-trees, blooming oleanders, aloe more than 30 feet high, the shining green foliage of the camellia, chestnuts, cypress, plane-trees, Brazilian pine, laurels, myrtles, odoriferous magnolias, fuchsias, together with bananas, sugar-cane, coffee shrubs, mangroves, pomegranates, tamarinds, pine-apples, and gigantic dragon-trees. One must travel a long way indeed before meeting with prettier scenery, or a place that will surpass in fragrance and loveliness the floral beauty of this island; and yet it is only within five or six days' run of our cold shores of England.

The product which has made the name of Madeira famous and familiar is its wine, which is now produced in great quantities; this and the cultivation of the sugar-cane form its principal trade.

The public buildings offer little to attract notice; the churches are insignificant, and even the cathedral, a building in the basilica style, is in no way remarkable otherwise than by the innumerable garlands and lowers, offerings of pious devotees.

The attractions of beautiful walks in the most enchanting neighbourhood enhance the pleasantness of the climate of Funchal, so much resorted to by invalids, for within a short distance of the landing-place are splendid avenues of massive oaks and magnificent plane-trees, forming delightful promenades, with repose and shade, under the dense foliage of their wide-spreading branches.

The existing conveyances are either horses, hammocks, sedan-chairs, or sledges drawn by oxen. No stranger should miss the diversion of travelling down from the Nossa Senhora de Monti, where one has a slide down the mountain-side, above 1800 feet, into the heart of the town, on small double-seated wooden sledges. These curious vehicles are guided in their descent with admirable skill by a couple of natives, and, notwithstanding the velocity with which they rush down the incline, it is very rare that even a slight accident is heard of. These sledging parties, which are inexpensive, constitute the favourite amusement for visitors.

The dress of the natives is extremely simple, and, as the climate is subject to such slight extremes, their winter and summer attire is much the same, and generally consists of a pair of trousers of some light material, a shirt, and linen jacket; shoes are a rare exception. As a head-dress they wear a curiously shaped small cloth cap, terminating in an erect, pointed tail from 5 to 6 inches

long. This seems to be a remnant of a turbaned head-covering worn formerly by the inhabitants of the African coast, with whom the early settlers carried on the slave trade.

The women, like the men, are not overburdened with apparel, and are mostly employed as labourers in the vineyards and gardens.

During the two days of our stay in Funchal the weather was very favourable for coaling, which was satisfactorily finished, and on the 5th February we proceeded out of the bay, and, with a favouring breeze, were soon off the "Desertas," a group of barren rocks about 11 miles S.E. of Madeira. These rocks appear to be only frequented by fishermen, who repair thither for collecting orchil. The northernmost isle is a high pyramidal rock, often taken for a sail, which it much resembles. The weather continuing very favourable, the next day we sounded in 2000 fathoms, and early the following morning the brilliant light on Cape Anaga (Teneriffe) was descried ahead. As daylight dawned, we steamed in for the land, and the high, precipitous rocks, all bleak and bare, here and there broken by deep and rugged clefts, rose in bold outline before us. Later in the day, as the clouds cleared, the celebrated Peak was in sight, a grand and solitary object towering in seeming desolation; for although there is a certain amount of fertility on its sides, it was not apparent as we approached it. During the forenoon we anchored off the town of Santa Cruz, and, after a visit from the health officers, all were free for a run on shore. There is little at Santa Cruz itself to interest a stranger; the houses are poor structures, the streets narrow, and there are no public buildings with any pretension to taste or elegance. Nevertheless one is repaid for a stroll in the country, where the scenery is remarkably wild and impressive—deep ravines, from which mountainous rocks rise abruptly void of every trace of vegetation except a few cacti and other hardy plants.

There is a sort of grandeur in this volcanic scenery—in the scorched craters of these enormous rocks, ribbed at the sides, rising into a variety of shapes. Now all is quiet, no traces of life, no appearance of vegetation—all is arid, dry, and parched; while away to the southward can just be discerned a fine picture of woodland scenery, arresting the eye at once by its great contrast, and, as it were, compelling one to admire the extreme beauty afforded by the charming landscape. Here and there were noticed inclosures of cacti, used in rearing the cochineal, which, with the castor-oil plant, appears to be extensively produced for exportation. Our stay at first was only for two days, during which a party of naturalists landed, and made an attempt to ascend the famous Peak (12,180 feet). They had a pleasant time of it, reaching 9000 feet, where

they found the temperature of the air at night intensely cold. It was too early in the season for natural history work; still collections geological, botanical, and zoological were made.

While the naturalists were away, the vessel cruised about, and obtained a series of dredgings, serial temperatures, and soundings, between Teneriffe and Palma, and past Gomera and Hierro. Considerable depths were found, varying from 200 to 1700 fathoms; as a rule discovering a dark sandy bottom and dead shells.

Three days had thus been spent when we again anchored off Santa Cruz, and, as we were to leave the next day, H. B. Majesty's Consul issued invitations to a ball in honour of the visit of the *Challenger*. The weather was fine, and a large party started from the ship, arriving at the Consulate in good time to find all the available Spanish beauty there to meet us. The ball was a very capital one, but the great drawback was our being unable to converse fluently with our partners when dancing. For all that, the eye, whose language is so deep and expressive, the organ which the Spanish ladies cultivate to such perfection, did all. What the heart felt and the tongue could not utter the eye interpreted. The company was, however, not entirely Spanish. The Consul's daughter, and Mrs. Grattan, the American Consul's daughter, and an English lady, married to the Minister of Marine, were there to interpret our most pressing wishes and entertain us with their company.

It was not until the early hours of the following morning that the pleasant gathering broke up, and we all retraced our way to the landing-place to get on board.

The town of Santa Cruz is famous in our naval history. On the 20th April 1657, Admiral Robert Blake attacked and utterly destroyed the Spanish fleet, strongly placed under the batteries, and, aided by a sudden shift of the wind, was able to draw his ships off with comparatively little loss.

It was here also that Nelson (July 24, 1797) undertook his expedition against Teneriffe, which, although unsuccessful and disastrous, displayed great heroism and bravery. The two flags captured on the occasion are retained in the church, and the inhabitants still bear in mind the history of the attack and repulse relating to their capture.

CHAPTER III.

TENERIFFE (CANARY ISLANDS) TO ST. THOMAS (WEST INDIES).

Leaving Teneriffe—Sight of the Peak—Commence section across the Atlantic—Daily soundings and trawlings—The results—Configuration of the bottom—In the Tropics—The officers of the ship—Life on board—Our daily doings—Description of the mode of sounding—The apparatus and appliances used—Taking serial temperatures—Dredging and trawling—Island of Sombrero in sight—Arrive and anchor at St. Thomas.

As the evening of the 14th February dawned, we left the Bay of Santa Cruz, dispensing with steam when well clear of the land. The bright moonlight afforded us a capital view of the Peak, which frowned down in all its grandeur, clearly and sharply defined, and its head hoary with many a winter's snow. A fine favouring breeze was with us all night: at dawn of the following morning the island of Teneriffe was looming far on the distant horizon.

From this date may be said to commence the regular work of the Expedition. A section was now to be carried right across the Atlantic from Teneriffe to Sombrero (a small island forming one of a group of the Virgin Islands), a distance of about 2700 miles; and along this line over twenty stations were fixed on at which it was decided to make careful observations as to depth, temperature, and nature of the bottom. These stoppages were about 100 miles apart, and each day, when the weather permitted, soundings and dredgings took place. For the first 250 miles the bottom of the ocean was found to be nearly level at a depth of about 2000 fathoms, consisting, for the most part, of the globigerina ooze of the Atlantic. On proceeding some 50 miles farther to the westward, we sounded in 1500 fathoms, identically on the top of a ridge, where, after dredging for some time, a quantity of dead, hard, white coral, together with several beautiful specimens of sponge attached to its branches, was obtained. From this position, soundings made the next day showed that the bottom sank rapidly until reaching a depth of 2700 and 2950 fathoms, from the first of which a few living specimens of starfish, annelids, &c. were obtained in the dredge; but the most remarkable fact was that, with the increasing depth, there was a gradual change in the character of the bottom.

On the 26th February, in latitude $23^{\circ} 23'$ north, longitude $35^{\circ} 10'$ west, being about 1600 miles from Sombbrero Island, we sounded in 3150 fathoms. This was the greatest depth as yet met with, the material obtained from the bottom being quite new to science. For several days after, the dredge continued to bring up a dark chocolate or red clay, scarcely containing a trace of organic matter, and entirely devoid of animal life. This newly discovered formation going on at the bottom of the sea appeared, as was found afterwards, to extend for some 350 miles, when the depth decreased gradually until 2000 fathoms was obtained, and the dredge again brought up animal life. The nature of the bottom changed gradually into the usual Atlantic ooze, altering again in a few days, as the depth increased to 3000 fathoms, when the mud lost all trace of carbonate of lime, and resumed its red colour, which continued to within 100 miles of Sombbrero. The analysis of the deposit proved it to be almost a pure clay (a silicate of alumina and the oxide of iron, with a small portion of manganese). This red mud (or more probably the circumstances which cause its deposition) was found altogether unfavourable to the development of species; and, although it has been since proved that animal life is possible at *all* depths, it has been found, after reaching, say, 1000 fathoms, that its abundance greatly diminishes. It was in one of these dredgings we were successful in obtaining a beautiful blind crustacea, perfectly transparent, which, although found at such great depths, does not appear to suffer from this peculiarity either in development or colour, nature having supplied claws and feelers to make up for the suppression of eyes, the sense of vision being useless in its normal state of perpetual darkness.

When about two-thirds of the distance between the Canary Islands and the West Indies, we had reached the Tropics, and were fairly in the region of the trade winds, of which we took advantage; still we occasionally "hove-to," for the purpose of sounding and dredging; on its conclusion again standing on our course, with a steady breeze.

And now, while enjoying such pleasant weather, I take the opportunity of introducing my reader to the officers of the Expedition, and who were for the most part our companions through the various incidents of the cruise.

The naval officers had been selected by the Admiralty, in most cases, for some special acquirement; and the staff of civilian naturalists and physicists had been nominated by a specially appointed committee of the Royal Society.

Captain George S. Nares, F.R.S. &c., was appointed in command

of the Expedition. His name is familiar to the public from his surveying services, his standard works on seamanship, and, recently, from his having been in command of the late Arctic Expedition. From his previous scientific training, he was eminently fitted for the responsibilities imposed upon him. His second was Commander J. F. L. P. Maclear, also well known in the scientific world, and who has seen much service in various parts of the world; on him devolved the entire charge of the magnetic department. Lieutenants Pelham Aldrich, A. C. Bromley, and G. R. Bethel were each specially qualified in surveying or magnetic work. Staff Commander Tizard, a surveyor of high reputation, was in charge (under Captain Nares) of the whole of the navigating and hydrographic duties, assisted by Sub-Lieutenants Havagall and Swire. The hygiene was in charge of Staff Surgeons A. Crosbie and G. Maclean.

The engineering department, on which so much of the success of the Expedition depended, was under the direction of J. H. Ferguson, as chief, assisted by W. J. J. Spry, A. J. Allen, W. A. Howlett, and W. J. Abbott; and the machinery, on the return of the vessel after her long cruise, was as efficient as when she started. Paymaster R. R. Richard, Assistant Paymaster J. Hynes, with Sub-Lieutenants Lord George G. Campbell, A. F. Balfour, A. Channer, and H. E. Harston, were the other officers.

Professor Sir Charles Wyville Thomson, F.R.S. &c., had been selected as Director of the Civilian Scientific Staff, and (as has since been proved) none could have been found better qualified to fill the important position. With the practical experience he had already gained in the *Porcupine* and *Lightning*, he was enabled to utilise and work out all the subjects that came within his reach during our more extended cruise. His assistants were H. N. Moseley, M.A., Dr. von Willemoes-Suhm, and J. Murray, who undertook the naturalist and botanical department. J. Y. Buchanan, M.A., acted as physicist and chemist, and J. J. Wild, as artist and secretary. This staff of especially selected scientists, each distinguished for some particular attainment in his profession, completed the list.

Life on board ship, the varied incidents at sea, all tend to rouse feelings and sensations which are reserved alone for those whose business is on the great waters. To those constituting the scientific staff, the routine, especially of a man-of-war, was entirely different from that they had hitherto enjoyed on shore, and unfortunately their initiation to the ever varying scenes was under most unfavourable circumstances as regards the weather. At first the etiquette and usages of naval every-day life seemed particularly vexatious and annoying; but after a while, when fine weather again set in, and

the sea-sickness had been got over, one and all perceived, to a certain extent, the necessity of order. Scrubbing, washing, and holystoning of the decks, cleaning brass and wood work, mustering at quarters and divisions, are all measures which tend to enforce the discipline so essential to good government.

Existence in the limited space of a ship, which is frequently for months completely isolated from the outer world, is so peculiar and interesting to those unacquainted with the sea that I may be permitted to make a few remarks as to our daily doings.

From the hour of four o'clock in the morning, as soon as the watch has been mustered, the bustle and activity begin, lasting throughout the day and even to the hour when night reminds one of sleep. Pumps are manned, and water is splashed over decks in all directions; and, although apparently unnecessary at times, yet it is absolutely essential to the preservation of the health and comfort of those on board. By six o'clock the washing is nearly finished, when all hammocks are piped up and stowed; it is now time for breakfast, consisting of cocoa and biscuit. The hands dress in the rig of the day, and all preparations are made for sounding and dredging. Sails are furled, and steam is ready, for it is essential to keep the vessel's head on to the sea during these operations. Before commencing, however, an account of how the soundings and dredgings are obtained, it might be as well to specify the sort of information that is required from us. Formerly the actual depth of the ocean only was required, and in extreme depths it was considered a great feat to be able to bring up a specimen of the bottom. Our requirements and means of obtaining information have so rapidly advanced that we not only obtain the sounding and bring up specimens, but we also ascertain the temperature of the sea at every 100 fathoms, from the surface to the bottom, and at the same time bring up samples of the deep water.

It has been found that in all deep soundings it is absolutely necessary to use steam-power. No trustworthy results can be obtained from a ship under sail, as even in the calmest weather the heave of the sea, or the surface current, is sufficient to drift the ship in a very short time a considerable distance from the place where the lead was originally let go. It is thus impossible to obtain a perpendicular sounding; besides, the time intervals between the 100-fathom marks are upset, these time intervals being the only means of telling when the lead has reached the bottom.

The first thing, therefore, to be done is to shorten and furl all sail, and bring the ship head to wind, regulating the speed in such a manner as to avoid forcing her through the water.

The sounding apparatus is then got ready. A block is placed on the mainyard a little outside the boom iron, and a whip rove through it to trice up the accumulator (Fig. 1). These accumulators are india-rubber bands, $\frac{1}{4}$ inch in diameter and 3 feet in length. They are capable of stretching 17 feet, when they each exert a pressure of 70 lbs. Twenty pairs of these accumulators have been found sufficient for most of the soundings obtained, as they are strong enough to withstand the strain of the weights on the lead-line without being too strong to give readily with the motion of the ship; their greatest use being to keep the sudden jerks of the ship's motion from bringing too great a strain on the lead-line. At the bottom of the accumulators, which are kept separated from each other by being passed through holes in a circular disk of wood, a 9-inch block is hooked, and through this block the lead-line is rove. The end of the line is then secured to the sounding-rod, to which is attached the number of iron weights required to sink it rapidly. A short distance above the rod the slip water-bottle is fastened, and above that a deep-sea thermometer.

FIG. 1.



Two descriptions of sounding-rods have been in use during the cruise. The one first employed is known as the "Hydra" rod (Fig. 2), and consists of a brass tube 1 inch in diameter, and 42 inches in length, having at its extreme end a butterfly valve, and at its top a sliding rod 30 inches in length. On the upper part of this rod is a small stud, with a spring reaching to its head (when there is no pressure on it); to this rod the weights are attached, and, by means of the spring, disengaged, when at the bottom, in the following manner.

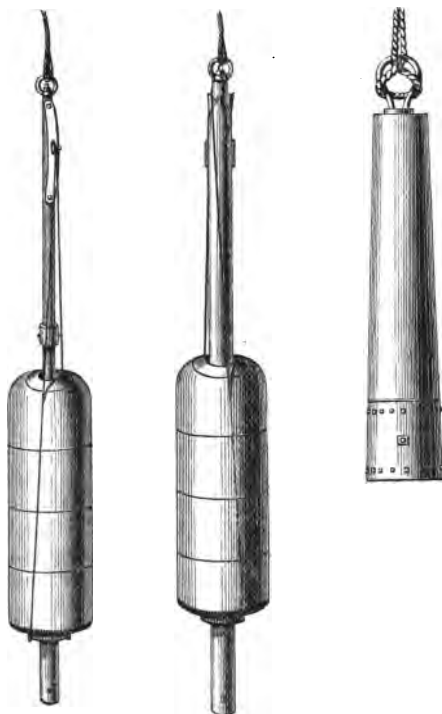
The sinkers are of cast iron, and average one hundredweight each. They are cylindrical in form, having a hole through the centre; through this hole the rod is placed, and as many weights are put on as are deemed necessary (generally speaking, one for every thousand fathoms). At the bottom of the last weight a small iron ring is rove on the rod, to which is attached a piece of iron wire about 12 feet in length. The bight of the wire is passed over the projection, and the rod being lifted, the weights rest on the ring, which is supported by the wire sling. The strain of the weights falls on the stud, thus pushing back the spring; and as

long as the pressure of the weights continues on the ring at the bottom, the wire remains in its place. When the weight of the sinkers is relaxed, by their reaching and resting on the bottom, the spring pushes the wire off, and the rod, being hauled

FIG. 2.

FIG. 3.

FIG. 4.



up by the line, unreeves itself from the weights, leaving them at the bottom.

The second sounding-rod (Fig. 3), which was principally used, is the invention of Navigating Lieutenant Baillie, R.N., and consists, as in the "Hydra," of a cylindrical rod, of 3 inches in diameter and some 48 inches in length. The iron sinkers are rove

on the rod in a similar manner to the former, but the means of disengaging and the safety in lowering are more to be depended on. The bight of the wire supporting the weights is placed over a sliding "ketch." On the rod reaching and resting on the bottom, the "ketch" drops over a conical end, and thus releases the weights, which remain at the bottom. The tube being larger than that of the "Hydra," it brings up a greater quantity of sample from the bottom.

These rods are only employed when the depths are considered to be over 1500 fathoms; for less depths a conical lead weight (Fig. 4) is used, which has fitted to its bottom an iron cylinder, 3 inches in diameter, with butterfly valves at its base for securing samples of the ocean bed.

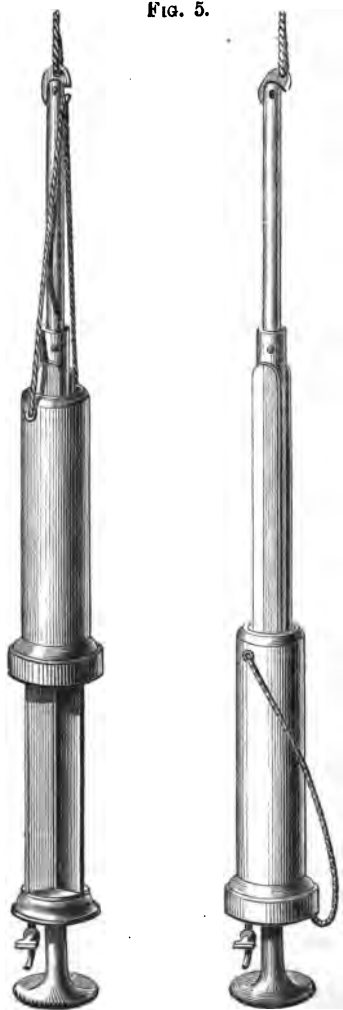
The line used for sounding is 1 inch in circumference, and is specially prepared for this service (having a breaking strain of 14 cwt.); it is marked at every 25 fathoms, the 25- and 75-fathom marks being white, the 50-fathom marks red, and the 100-fathom marks blue. Worsted is used to mark the line, and the number of hundreds are distinguished by tucking the worsted under and over the strands of the line, one tuck for each hundred fathoms. This leaves the line perfectly smooth; no additional friction is caused in the water, nor is there any danger of the marks of the line fouling in the blocks through which it passes. The line is kept on reels (3000 fathoms on each) conveniently situated near the sounding-platform, from which it is led through a block to the winding-engine, then up through the block at the mainyard, and attached to the sounding-rod.

The slip water-bottle (Fig. 5) consists of a brass rod with three radiating ribs to strengthen it, and to act as a guide for a brass cylinder which incloses the water. At the bottom and halfway down the radiating ribs are two finely ground seatings, and the brass cylinder is so arranged that its upper and lower surfaces fit with great accuracy on these seatings, thus inclosing anything that may happen to be between them. At the top of the rod is a brass tumbler, with a slit in it; to this tumbler is attached a lanyard to fasten the bottle to the sounding-line, and over the slit of the tumbler is placed the bight of a piece of small line (the ends of which are secured to the cylinder), by which the cylinder is kept suspended above the seating while the bottle is descending, and being in this position quite clear of the radiating ribs, it allows the water to pass freely through it.

Directly the strain is released on the sounding-line above, through the bottle reaching the bottom, the tumbler falls over, pushing off the line that suspends the cylinder, leaving it free to fall on the two

seatings, and thus effectually inclosing a specimen of the bottom

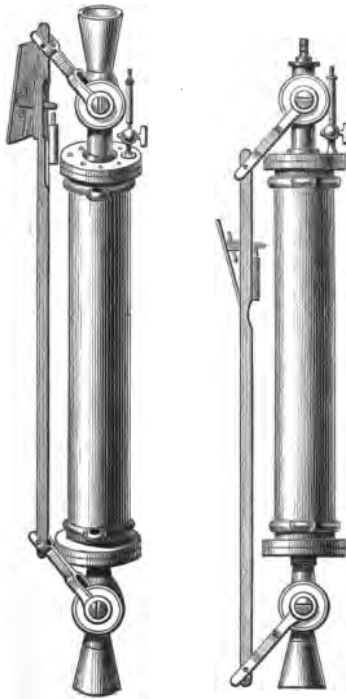
FIG. 5.



water. A tap is arranged at the lower end to facilitate the emptying of the bottle when again on board.

Other bottles (Fig. 6), but of different construction, for carrying out similar results were employed with equal success; they consisted usually of a brass tube about 3 inches in diameter and

FIG. 6.

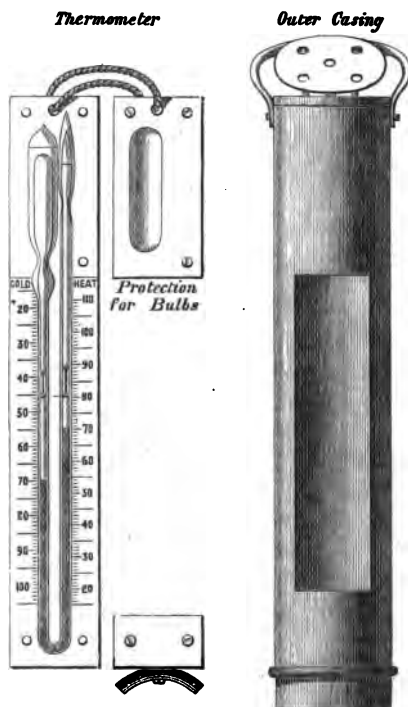


from 2 to 3 feet in length, fitted at either end with stopcocks connected to each other by means of a rod on which is a movable float. When lowered to any desired depth, both cocks being open to allow the column of water to freely pass through, immediately the motion of lowering is reversed and hoisting commenced, the flat float being pressed on by the weight of water above it shuts

both cocks simultaneously, and so incloses a specimen of the water at that particular depth.

The thermometers (Fig. 7) used to ascertain the temperature at the bottom or at any intermediate depth are self-adjusting maximum and minimum instruments, known as Miller-Casella thermometers,

FIG. 7.



from the names of their inventor and maker, and are so constructed as to resist the pressure of the water at very considerable depths. They consist of a carved tube with a bulb at each end, one of which is filled with creosote, the expansion and contraction of which gives the temperature. The creosote acts on a small quantity of mercury in the tube, which rises and falls as the creosote expands or contracts.

In each of the tubes above the mercury is a small metallic index having a hair attached to it, which, pressing against the glass tube, acts as a spring, and keeps the index in its place, so as to be read off and recorded.

It is evident that the bulb of the thermometer would be exposed to the pressure of the water as well as the temperature; to prevent this, an additional bulb is blown outside the bulb of the thermometer; this is partially filled with spirit, which is boiled before it is hermetically closed, so that it contains in addition to the spirit some spirit vapour. The pressure now acts on the outer and not on the inner bulb, which is therefore only affected by temperature. These thermometers are tested by hydraulic pressure, from two to three tons on the square inch, and are considered trustworthy up to 3000 fathoms.

On commencing the operations of sounding, the weighted sounding-rod, the water-bottle, and the thermometers are suspended to the line, and lowered from the sounding-bridge by reversing the engine for 500 fathoms; the line is then let go and allowed to run out freely. As it runs out, the exact time of each 100-fathom mark entering the water is registered, and set down in its appropriate column in a book provided for that purpose. These intervals gradually increase in duration as more line is paid out, the weights having to overcome the friction of the line in the water, which becomes greater with the amount run out. They will, however, be found to increase in regular proportion, so that, when four minutes are taken up by one interval, the weights have reached the bottom, or a depth of between 2000 or 3000 fathoms has been obtained.

The time intervals having informed us that the weights are at the bottom, the line is brought to the engine, and hove in, gently at first, but faster as the quantity out decreases; care being taken to keep the ship still in her position over the line, as, if allowed to fall off, the line has not only to bear its own friction, and that of the attached rod, water-bottle, and thermometers, but also the additional friction of the drift of the ship. Eventually the rod, water-bottle, and thermometers reach the surface, the thermometer is carefully read and registered, the water-bottle is sent down to the laboratory, where the specific gravity of the water is taken, and the contents of the sounding-rod are examined to ascertain the nature of the bottom, after which they are dried and bottled.

The soundings having been obtained, and the line hove in, the next proceeding is to register the temperature of the ocean from the surface to the bottom. This is done by attaching thermometers with equal spaces between them to the sounding-line; a cup-lead

(Fig. 8) of 1 cwt. is attached to keep it perpendicular, and immediately above a thermometer is placed; the line is then eased out to the first 100 fathoms, when a second thermometer is secured, and the line lowered to 200 fathoms, a thermometer being placed at each 100-fathom mark until six or eight have been attached and the line run out to the required depth, say to 1500 fathoms; it is now belayed and allowed to remain for a few minutes. The thermometers register the temperatures of the different depths at which they are submerged. The line is now hove in, and as each thermometer reaches the sounding-platform, it is removed, and the results are carefully read off. The temperature is then taken from the surface to 700 fathoms in the same manner. Sometimes it is considered necessary to obtain temperatures at every 10 fathoms from the surface to 200 fathoms, and at every 50 fathoms to 600 or 700 fathoms; this, of course, considerably increases the time occupied in obtaining these observations.

FIG. 8.



When the whole of the soundings and temperature observations have been obtained between any two places, a plan is drawn showing the section of the bottom and isothermal lines at different depths.

For the purpose of dredging in deep water, three different-sized ropes are supplied, of 2, 2½, and 3 inches in circumference. Each rope is spliced so as to form one continuous length of 3000 to 4000 fathoms, and is kept coiled away in a large rack, conveniently situated for use. These lines are marked at each 100 fathoms in the same manner as the sounding-line.

The dredges (Fig. 9) supplied consisted of an iron frame, and were of three sizes, 5, 4, and 3 feet in length, and from 15 to 9 inches in width. The iron frame, to which was secured the bag or net, is intended to skim the surface of the bottom, and the net to catch and retain all that might come in its way; at the bottom of this bag a number of hempen swabs were generally secured so as to sweep along and bring up small animal life, coral, sponges, &c. These dredges after a time were set aside and replaced by the ordinary beam trawl as used in shallow water around our own coast.

The operation of dredging or trawling, like that of sounding, is carried on from the mainyard, the dredge rope being rove through an iron block which is attached to the accumulator in the same manner as described for sounding.

For this operation it is necessary to use a much larger accumu-

lator (Fig. 10), consisting of as many as seventy or eighty india-rubber bands, 3 feet in length, capable of stretching to nearly

FIG. 9.



FIG. 10.



20 feet when a force of $2\frac{1}{2}$ tons is exerted (that is, equal to the breaking strain of the $2\frac{1}{4}$ -inch rope).

The accumulator is secured to the masthead by means of a long pendant, and hauled out, or eased in, by a tackle at the end of the yard, as may be required. The dredge or trawl, being ready to go over, is triced up clear of the platform and hauled out by the tackle until well clear of the vessel's side; the rope is then let go and allowed to run out freely, the ship steaming slowly ahead; from 2½ to 3 hours are usually required to sink the dredge in this manner, when the depth is about 2500 fathoms. When it is once down, which is easily found by experience, the vessel is allowed to drift or steams slowly on for some hours, the accumulator illustrating by the expansion and contraction how the dredge is being dragged over the inequalities of the bottom. Should it foul anything, the strain of the vessel immediately stretches the accumulators to their utmost, the line is at once eased out to prevent it carrying away, and various plans are tried to release it. If all turns out favourable, when it has been on the bottom a sufficient time, the rope is brought to the deck-engine and the dredge hove up. When it appears above the surface, there is usually great excitement amongst the "Philos," who are ever on the alert with forceps, bottles, and jars, to secure the unwary creatures who may by chance have found their way into the net. Such a sight when it is really inboard; here we have no lack of wonderful things, strange-looking fish, delicate alcyonarian zoophytes, sea-urchins, starfish, besides shell, mud, &c.

During the time of sounding and dredging, the ship's company not specially employed on these operations have been mustered at division, attended prayers, and engaged during the forenoon in their various and requisite duties. At noon, dinner is piped, and although consisting, as it usually does, of either salt junk and duff, or fat, greasy salt pork and pea soup, there are few men healthier than the sailor. Grog-time comes next (when half a gill of rum with two parts of water is supplied to each man), and, with the hour for smoking, constitutes a pleasant break in the day. Duty is resumed again at 1.30, and various drills occupy the afternoon until 4.30, when all hands assemble at their station, with rifle, cutlass, and pistol for inspection by their divisional officer.

The inspection over (we will presume the dredge to be up, and the excitement of the haul subsided), "Hands! make sail," is the pipe. Steam is dispensed with, in a short time the sail is all spread, and with a favouring breeze we are running on our course at an eight-knot speed. Supper is now prepared, consisting of tea and biscuit, after which, until 9, smoking is permitted, hammocks having been piped down at 7.30. The commanding officer usually goes the round of the decks, to ascertain that all is correct, when

those off duty are expected to turn-in their hammocks, and so ends the day and its duties.

At 6 P.M. the officers usually dine together, when the incidents of the day, the results of the dredging, the prospect of the morrow, and other affairs which are sure to turn up, form a lively conversational hour. After dinner the assembly of smokers usually muster on the half-deck, where all sorts of yarns and topics engross the attention till bed-time.

Sunday alone seems to break the monotony and routine of everyday life at sea, when, after divisions and prayers, the remainder of the day is usually spent in reading or sleeping.

In this manner, and notwithstanding the continued sameness, days and months slip by, until we reach port and again anchor; and only when we look back over the work accomplished can we realise the length of time passed at sea.

On the 14th March, just a month after leaving Teneriffe, we reached the island of Sombrero; here we hove-to, and remained sounding and trawling in shallow water for a couple of days, with satisfactory results.

On the morning of the 16th the island of St. Thomas (one of the Virgin group) was in sight; and later in the day we anchored in the outer harbour.



CAMBER AND FLOATING DOCK, BERMUDA.

CHAPTER IV.

ST. THOMAS (WEST INDIES) TO BERMUDA AND HALIFAX (NOVA SCOTIA) AND BACK TO BERMUDA.

At St. Thomas—The town of Charlotte Amalia—Importance of the island—English vessel in distress—Tow her into port—Leave St. Thomas—The first death on board—Soundings—Burial at sea—Bermuda in sight—Sounding round the reefs—St. George's—The Narrows—Pretty scenery—Reach the anchorage in Grassy Bay—The Naval Yard—Historical sketch of the Bermudas—Geological and botanical researches—Leave Bermuda—Soundings—The Gulf Stream—Long Island to Nova Scotia—In Halifax harbour—The city and its suburbs—Gold and coal mines—Halifax to Bermuda—In the Camber—The sand glacier—The caves.

THE island of St. Thomas being usually very unhealthy, it was decided to anchor in the outer harbour, or Gregorie Channel. Here we swung ship, rated chronometers, and filled up with coal.

Naturally enough, after being a month at sea, most were anxious for a run on shore. We found the country and scenery pretty; the

lofty hills were varied in colour, and appeared to be thickly wooded with a variety of trees, all green and tempting, as far as the eye could reach.

The town, named Charlotte Amalia, has no pretensions to size or elegance. It is, however, most picturesquely situated along the northern shore of the island, backed up by high hills, and having a curious saddle-shaped mountain running through its centre, terminating in two peaks, some 1525 feet in height.

This island, which has in later years been visited with so many calamities, and laid waste from time to time by hurricanes and great revolutions in nature, still holds its position, and will continue to be an important possession, not from its trade or produce, but from its geographical situation. At the present time it is one of the most important ports of call in the West Indies, particularly for the mail service, some ten or twelve different lines reaching here monthly. There can be little doubt that the traffic will increase in proportion as sailing-vessels are superseded by steam.

A pleasant week was passed, and several excursions made to the adjacent islands of Sombbrero and St. John's, where not only dredging and sounding but good shooting were obtained.

Just as we were on the point of leaving, intelligence reached the port of an English vessel (of about 1600 tons) being in need of assistance. Instructions were given from the Consulate, and on the morning of March 23 we steamed in search of the derelict. After a short time the vessel was discovered at anchor, taken in tow, and brought into harbour. It proved to be an iron ship, named the *Varuna*, of Liverpool. We learnt she left New York in January last, and through falling in with very stormy weather had lost her main and mizen masts, and nearly all her sails, before she was abandoned to her fate.

Eventually it appears she was boarded by another vessel, a prize crew sent on board, who jury-rigged her, and thus she reached within 15 miles of St. Thomas, where we discovered her.

On the morning of March 24, we left the anchorage under sail; with the light prevailing winds we made but little progress, and the next day sounded and dredged in shallow water (390 fathoms) off the north coast of Culebra Island (near St. Thomas). During the operation of heaving in the dredge a fatal accident occurred, by the parting of a rope span used for securing the iron leading block for the dredge-rope, which in its flight across the deck struck a seaman, named William Stokes, so severely on the head as to produce concussion of the brain, from which he died in a few hours.

A short time after, when the dredge came up, it was found to

contain the usual globigerina ooze, and some specimens of coral and broken shell. On the 26th, being about 85 miles north of St. Thomas, a sounding was made in the great depth of 3875 fathoms; the dredge was lowered, and after some hours it was brought up with a considerable quantity of grey ooze, but no traces of animal life were detected.

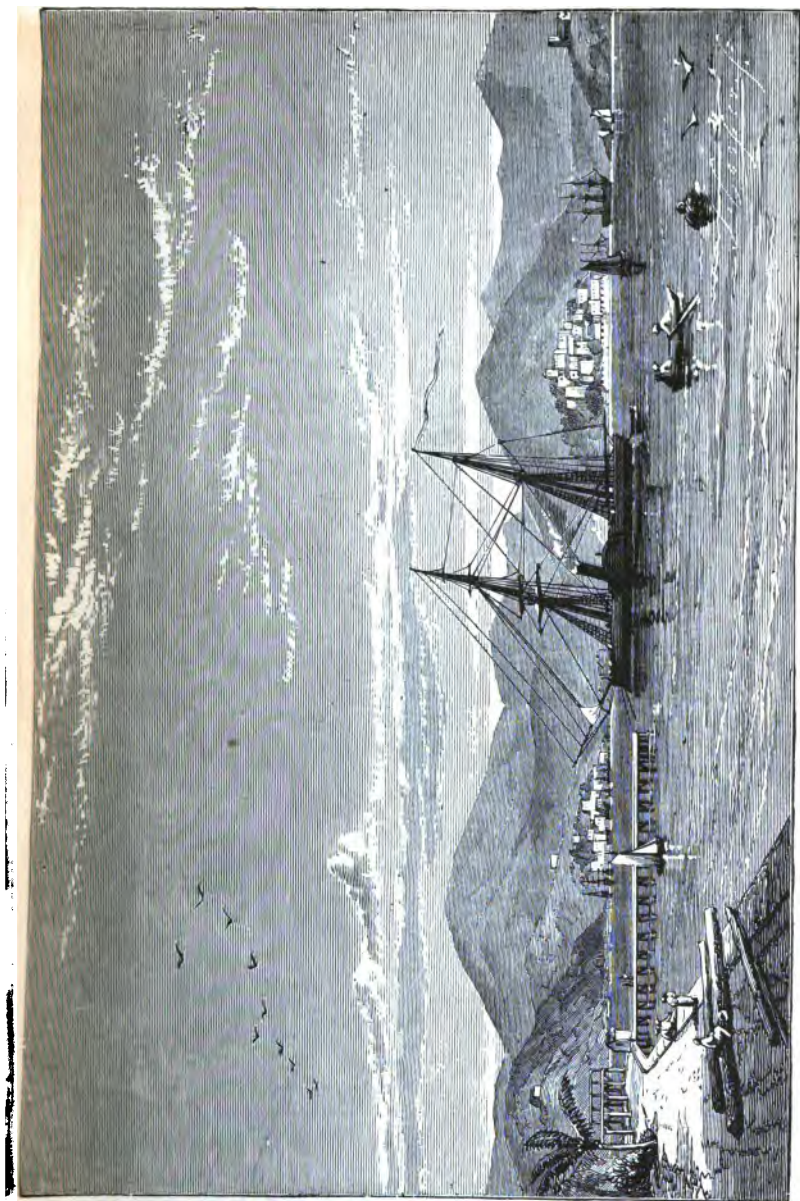
After evening quarters, the bell tolled, and all the ship's company assembled to pay their last tribute to their late shipmate. The captain read the beautiful and appropriate service for a burial at sea, and on reaching that portion, "We commit his body to the deep," it was slid out of the port, wrapped in a hammock weighted with shot, into the bright blue tide, to be seen no more until that day when the sea shall give up its dead.

For several days soundings showed an average depth of 2800 fathoms, with a red-clay bottom; this continued until within about 100 miles of Bermuda, when we again came upon the grey ooze.

On the 3rd April land was in sight; and as we approached the Bermudas, which are mere specks on the chart of the wide Atlantic, one is immediately struck with their somewhat dull and sombre aspect; the land nowhere rising to a greater height than 260 feet (where the lighthouse is situated), and by far the greater part not being more than from 25 to 50 feet above the sea-level. We hove-to for the night, and for a portion of the next day were engaged sounding and dredging round the reefs in a depth of 400 fathoms on a coral clay bottom; the results were, as is usually the case in the proximity of coral reefs, extremely poor, the coral sand débris being apparently unfavourable to the development of animal life.

On its conclusion, we closed on the land; and as we stopped off St. George's for the pilot to navigate the vessel through the intricate and dangerous Narrows between the reefs, the sight was indeed a pretty one. Nothing could have been more romantic than the little harbour stretched out before us: the variety and beauty of the islets scattered about; the clearness of the water; the quantity of boats and small vessels cruising between the islands, sailing from one cedar-grove to another, made up as charming a picture as could well be imagined.

Proceeding on, as we near the shore, the white houses of Hamilton are seen peeping out from amongst the dark-green foliage; then Clarence Hill, the official residence of the naval Commander-in-chief, is in sight, overlooking a pretty little bay and landing-place, with the dark cedars and other trees coming close down to the water's edge; Mount Langton, a charming spot, the residence of



VIEW AT ST. THOMAS.



the Governor, has been passed, and in a short time we anchor in Grassy Bay. Nature is looking beautiful, and the temperature is genial and pleasant. These islands, situated as they are between the parallels of 32° and 33° north latitude, are about equally distant from the West Indies and the coast of North America, consequently the climate is a mean between the two, partaking neither of the extreme heat of the one nor the excessive cold of the other.

April 5.—The morning was lovely, and from the anchorage the view in either direction was very beautiful: look where we would, there was some kind of prettiness. The land broken up into little knolls and cays; the sparkling sea running here and there into creeks, bays, and inlets, together with the ever green foliage of the cedar and oleander, combined to make a very attractive landscape. Directly in front of us was the Naval Yard, with its jetties and cambers, in which were H. M. ships *Royal Alfred* (flying the flag of the Commander-in-chief), *Terror*, *Irresistible*, and several small gunboats; later in the day the *Challenger* joined them, so as to facilitate refitting and completing necessary stores.

Close at hand is the great iron floating dock; and stretching away in either direction are extensive stores, factories, and the residences of the officials connected with the establishment.

These islands are said to have been visited nearly 400 years ago by a Spaniard named Juan Bermudez, and on their discovery being reported to Spain, they were described as the most remote of all the islands yet found in the world. From this date many years seemed to have elapsed without anything being recorded about them, except an occasional wreck, or stories of the old buccaneers, who were said to hold court here after some of their successful raids on the Spanish Main, and tradition even now informs us of untold wealth being buried about amongst the islands. Perhaps the earliest authentic account is that given by one of the crew of the *Sea Adventure*, a vessel that was wrecked off the coast in 1609. It appears this vessel had been fitted out in England to convey the newly appointed governor, Sir Thomas Gates, together with Admiral Sir George Somers and other officials, to the recently formed colony of Virginia; meeting with a dreadful storm, and suffering great privations, their vessel was run on shore, and became a complete wreck. The islands were found to be uninhabited, although there were evident traces of earlier visitors, for hogs were found to be very numerous, having probably been set adrift by them. Fish and turtle were also abundant; and, the visitors finding the climate so

pleasant and the land so productive, a year passed before any attempt was made to get away; by which time they had managed to build a small vessel, and in May 1610 set sail for their original destination.

On reaching Virginia, they found the colony so badly off for the necessities of life that Sir George Somers and a party of volunteers started for Bermuda to obtain supplies; and during this trip Sir George died, near the site of the present town of St. George, where there is a monument erected to his memory.

From reports reaching England about this time (1612), a chartered company was formed, colonisation commenced, and soon after the first party of settlers arrived, under the charge of Mr. Richard More as governor. From this date Bermuda became a British colony, with representative government and a legislative assembly.

As time passed on, its importance as a naval and military station became apparent, and large sums of money were expended on fortifications and improvements. Of late years the islands have become well known as the site of extensive convict establishments; but these, like all the other outlying penal settlements, have been broken up, and the convicts sent back to our own shores again.

At the present time the imports and exports are but small; and although possessing such a fine climate, its agricultural produce is limited (perhaps from a dearth of labour), for only about one-tenth of its area is cultivated, and this is only in isolated patches, where arrowroot and early crops of vegetables are produced for the American markets.

Here a fortnight was spent in scientific pursuits. The dredging around the reefs and the several deep-sea soundings taken in their neighbourhood prove Bermuda to be a solitary peak, rising abruptly from a base of only 120 miles in diameter.

The geological structure of this island was most carefully studied; the results showing them to be only one kind of rock, a grey limestone, which, with but few exceptions, was found to be of a soft, crumbling nature, yet capable of being employed for building purposes. The botanists paid a good deal of attention to the flora of the island, for the charming walks through the avenues and forests were additional inducements to persevere in this study.

We left Bermuda on the 21st April. On clearing the Narrows, soundings commenced around the reefs in over 2000 fathoms; bottom of coral clay. Search was made for a reported patch, which was found on the 23rd, about 13 miles south-west of the island, with 32 fathoms of water on it, and a bottom of pebbles and stones.

Here we anchored for one night, and the next day shaped a north-westerly course so as to carry a line of soundings to Sandy Hook.

The weather on the whole was as favourable as could have been expected at this season of the year. For a few days it was squally, while in the vicinity of the Gulf Stream, but when fairly across this belt, fine agreeable weather again greeted us.

The soundings obtained showed the bottom to be fairly level, at an average depth of 2600 fathoms to within 200 miles of Sandy Hook, when it shallowed to 1700 fathoms.

The soundings taken in crossing and near the Gulf Stream were of very great interest. On each side the depths were found to be respectively 2400 and 1700 fathoms, grey ooze bottom; while in the Stream itself the line ran out over 2600 fathoms without reaching the bottom. This sounding, however, was considered doubtful, there being a strong wind and current at the time dragging the line out of the perpendicular. The Stream was found to be about 60 miles broad, which was easily detected by the 8° difference of temperature on entering and leaving.

This influential current, little as it may be appreciated in a general way, is of the greatest importance to those countries whose waters are influenced by its flow. It takes its rise in the Gulf of Mexico, though it might be regarded as a continuation of the equatorial current which flows from the western coast of Africa across the Atlantic, absorbing the sun's rays as it advances, and storing away the warmth for future use. It then passes into the Mexican Gulf where its waters are raised to the high temperature of 86° , and then sweeps through the pass of Florida, skirting the shores of North America, until it takes that remarkable curve off Nova Scotia and Newfoundland which throws its waters across the Atlantic, towards the coast of Europe.

One branch curves downward, and flits past the Azores; the other glides northward in the direction of the British Isles and the Polar Sea.

Its length, if reckoned from its Mexican head to the Azores, is upwards of 3000 miles, and its average velocity is about 40 miles a day.

The great function of this stream is that of a bearer of heat, setting out at a temperature of 86° , losing not more than from 10° to 15° in its progress. It thus reaches our coast, and ameliorates the climate, for in point of latitude England corresponds with Labrador. All are familiar with the fact that in the latter regions the winters are exceedingly severe and protracted, and the vegetation poor and stunted. Had our shores been without this warming influence, and

the British Isles compelled to subsist on their own geographical allowance of heat, we should have been left in the same condition.

We were within 100 miles of Long Island when our course was shaped so as to pass south and west of the little George Bank, and so on to Halifax. In this run several dredgings and soundings were obtained in average depths of 1350 fathoms, the bottom yielding chiefly grey ooze, and the course of the Gulf Stream was again crossed. On the 8th of May, when about 90 miles south of Halifax, we sounded in 75 fathoms on Le Have Bank. On the morning of the 9th May, the outline of the coast of Nova Scotia was before us, and later in the day we entered between the headlands of the magnificent harbour of Halifax, which is so well sheltered by McNab's Island, lying at its mouth, that it affords security and safe anchorage to vessels of any magnitude.

This island is covered with extensive foliage and vegetation, all bright and green, and, with the pretty white lighthouse at its western extremity, can scarcely be surpassed for pictorial effect. Steaming on, we next pass St. George's Island, which seems to lie in the very heart of the harbour, and is well and strongly fortified. A short distance farther, and we reach our destination, alongside the wharf of the Naval Yard, for the purpose of completing stores.

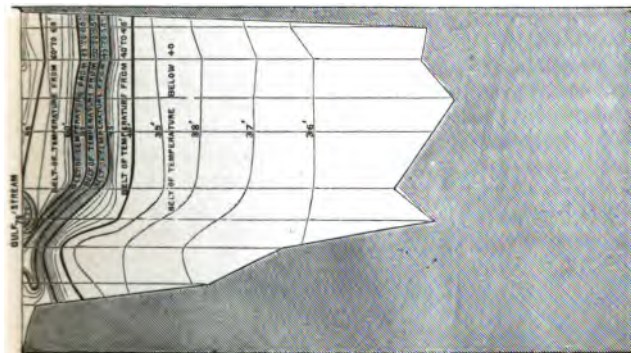
This colony, the history of which dates back to July 1749, was founded at the instigation of the Earl of Halifax, at that time President of the Board of Trade and Plantations.

The city, with its suburbs, extends for over two miles in length, along the slope of a hill on the western side of a very fine harbour. To the tourist it presents varied and numerous attractions.

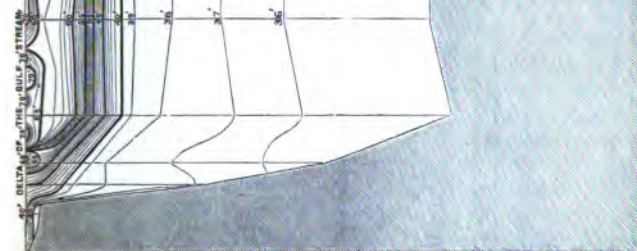
Its charming situation, its safe harbour and splendid scenery, are not to be surpassed on this side of the Atlantic. The sea runs up into various little bays and coves indenting the land in many directions, giving a variety of charming aspects to the entire scene, and finally ending in Bedford Basin, a broad sheet of water covering an area of nine square miles, its banks rich in varied foliage, amidst which cluster the pretty villa residences of the wealthy families.

The appearance of the city on first landing is not very prepossessing, but on reaching its centre, there are seen good broad streets, well built upon, with shops and stores of large dimensions, where all the luxuries and requirements of life are to be obtained. Amongst these, Granville and Hollis Streets take pre-eminence, containing as they do the best of the shops, and most of the principal public buildings, such as the new Post Office, House of Assembly, Public Library, &c., besides club-houses and banks, all worthy of note for the beauty of their architecture; in addition to

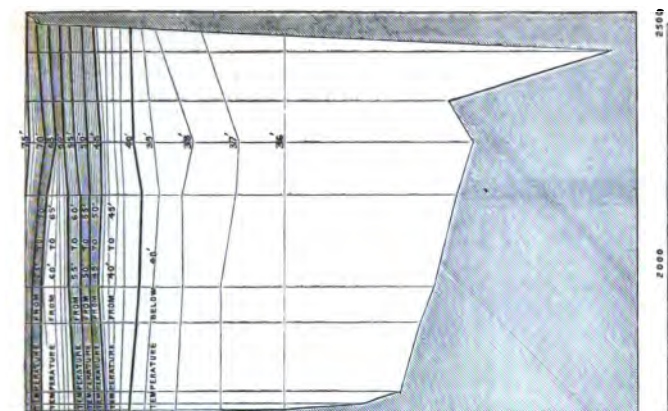
New York to Bermuda

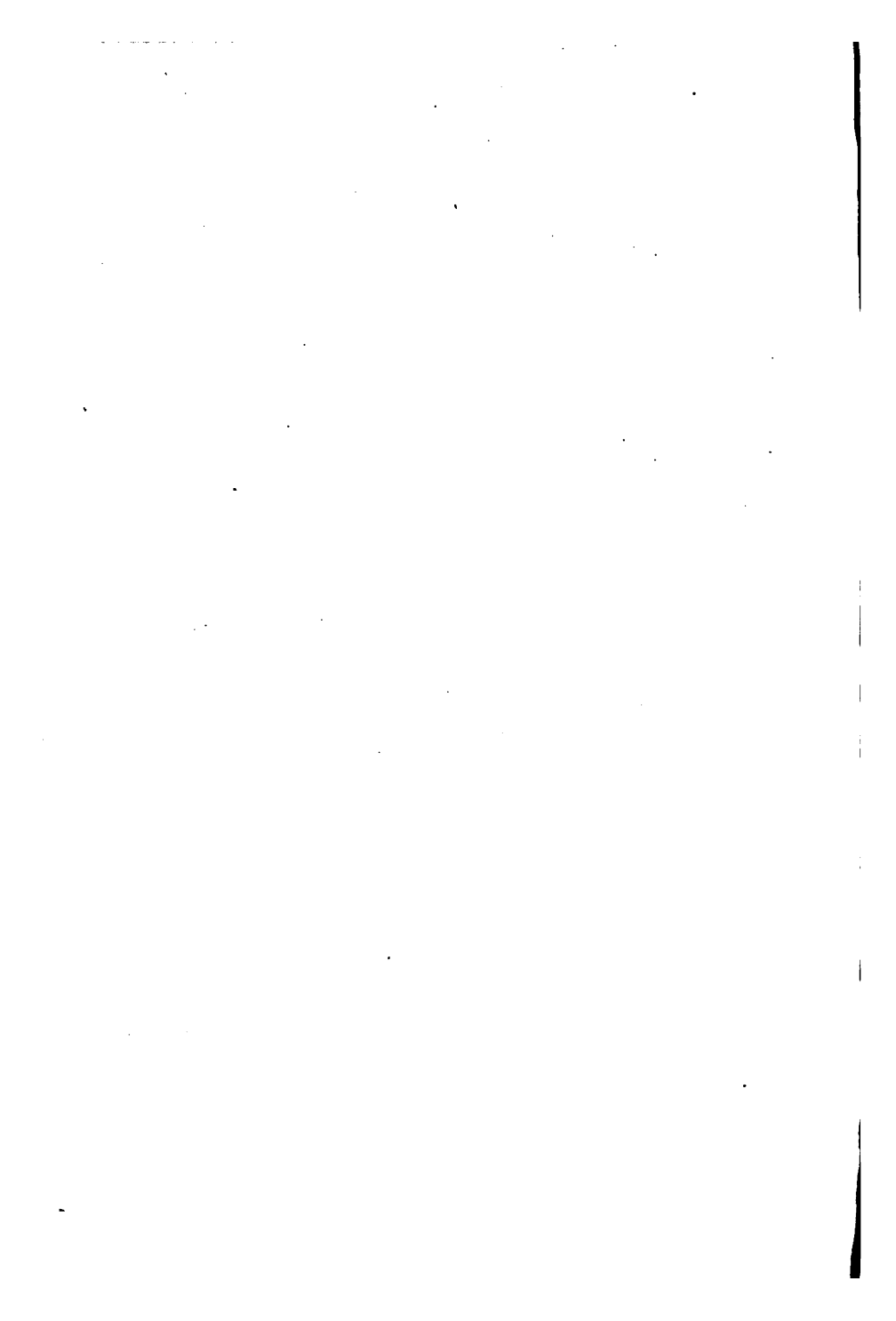


Halifax to Bermuda



Bermuda to St. Thomas





which may be enumerated Government House, Dalhousie College, Wellington Barracks, Hospital, and Admiralty House, all fine buildings of their class.

It is the seat of two bishops, the Anglican Bishop of Nova Scotia, and the Roman Catholic Archbishop of Halifax. There are over thirty churches and chapels, some of them very handsome structures, including almost all important denominations; and for charitable institutions, Halifax is said to outnumber any other city of its size in the Provinces. Among them are asylums for insane, deaf and dumb, the blind, besides some twenty others, where all sorts and conditions of men and women can receive aid and assistance in time of need.

There are in the city seven or eight banks, a Masonic Hall, and clubs; several gold-mining and joint-stock companies, news-rooms, public libraries, museums, and other institutions, all of which the Halifax people are very proud of; and well they may be.

The Naval Yard, which covers an area of fourteen acres, is at present principally used as a depot for stores; its value as a naval station is considerable, and was fully known as long ago as 1793, in the wars of those days, and even later, when it became the rendezvous of our West India Squadron, and received all its prizes. Attached to it is the Naval Hospital, which should not be overlooked, for here many a poor, stricken fellow is brought up from the West Indies with fever, to recover by the aid of this healthy invigorating climate.

The famous Citadel, situated on the crest of the hill overlooking the town, is said to be, after Quebec, the strongest in the Dominion. From here we have a fine panoramic stretch of scenery; the picturesque abounds everywhere, and from every point there is some glimpse of nature to charm, whether it be mountain, valley, island, or lake. From this standpoint we can obtain a peep of the north-west "Arm," with the number of pretty little islands scattered over its length and breadth. The nature of the land about here, with its green slopes running close down to the water's edge, has greatly assisted, with the many charming villas erected in the midst of the ever green foliage, in combining art and taste, giving such charms to the surrounding scene the most enthusiastic admirer of nature could scarcely desire more.

Then there is the eastern shore and town of Dartmouth, which has to be reached by steam-ferry. Here are many pleasant walks, and during the winter seasons its inland lakes are gay with crowds of skaters.

The public gardens, covering an area of nearly twenty acres,

deserve more than a passing mention; for their loveliness and beauty can be appreciated by the ordinary observer as well as the learned.

Picnicking is one of the favourite amusements of our Haligonian cousins, which they appear to heartily enjoy: during the season everybody goes picnicking, from the government official to the poorest member of the community, in one or other of the many beautiful little bays or coves in the harbour.

Then, with such facilities as the harbour possesses, all sorts of boating and yachting and fishing are in high favour. Capital regattas are frequently held, and the clubs usually make good shows as regards number, build, management, and speed.

Halifax is the port of call of nine lines of steamers; and in the course of a short time, when the great intercolonial railway shall be completed, it will give easy access to all the markets of Canada and the United States, and become the great winter terminus of the Dominion.

During our stay, as we lay alongside the Naval Yard, every facility was afforded our Halifax friends to visit the ship. Many availed themselves of the opportunity, and evinced the greatest desire to see and examine the many submarine wonders that had up to this date been collected.

The members of the Halifax Institute of Natural Science mustered in strong numbers, and appeared to take a special interest in the work already accomplished.

The blind crustacean zoophytes, the varieties of rare and new forms of corals and sponges, were well scanned; while amongst other things which attracted the attention of the geologist, was a large boulder, which had been brought up in the dredge some 300 miles south of the coast. This was carefully examined, and eventually recognised as a piece of Shelburne granite, which perhaps was carried off to sea in long past ages, on an iceberg detached from the coast glacier of Nova Scotia, and deposited where we had found it, to be again recovered after such a lapse of time, and to help the solution of the glacial theory, according to which, at one time, ice held Nova Scotia in as close an embrace as it does Iceland and Greenland at the present.

The weather had not been of the best; cold winds, with occasional snow and rain, greeted us during the time at our disposal here; yet we would fain have made a longer stay amongst such kind friends, of whom it is a pleasure to speak. There was a goodness and cordiality with their hospitality and warmheartedness such as can never be forgotten by those who know them.

On the 19th May, we steamed out of the harbour, and before nightfall the coast was out of sight. On clearing the land, a section was commenced in almost a straight line to Bermuda. The serial temperatures taken during the passage were extremely instructive and important, showing, as they do, that a belt of warm water of a temperature of 65°, and nearly 400 fathoms in thickness, extends from the eastern margin of the Gulf Stream to within a short distance of the West Indies, encircling the Bermudas, and actually raising the average temperature of its superficial water above that of the corresponding layer some 650 miles farther south. It also proved that the cold surface current running to the southward along the American coast merely lowered the temperature of the intermediate strata, the bottom water not being in the least affected by it. In fact, the results of the temperature observations already obtained seem to indicate that the cold water at the bottom of the Atlantic is obtained from Antarctic sources. Nine important stations had been examined on our way, showing an average depth of 2500 fathoms.

Late on the evening of the 28th we observed the light on Gibbs Hill, Hamilton, sparkling brightly ahead. Hove-to for the night, and for the next two days continued sounding and dredging round the reefs. Swung ship both for magnetic and azimuth correction, after which stood in for the Narrows, got the pilot on board, and a few hours later we were alongside the jetty of the Naval Yard, where we found H. M.'s ships *Terror*, *Sirius*, *Minstrel*, *Fly*, and *Britomart*. Here we remained for ten days refitting and completing stores, and during this interval many scientific excursions were made about the islands. To the geologist, particularly, the examination and phenomena of the sand glacier were exceedingly interesting. It appears that the fine coral débris which surround the shore are caught at certain exposed parts of the coast by the prevailing winds, and so blown into heaps more than 30 feet in height. We were informed that on some parts of the southern shore, where deep valleys once existed, level plains are now to be seen. And this is still going on, overwhelming gardens, houses, and plantations in its way, and but few attempts appear to be made to stay its progress.

In some places where these great heaps of sand had accumulated and hardened by the action of rain and other processes (by which this coral sand is converted into limestone) were to be seen rocks of the most irregular and fantastic shape, forming many of those remarkable caves which are, in most cases, covered with luxuriant vegetation, and add so much to the interest of these islands.



NATIVES OF SANTIAGO, CAPE DE VERDE ISLANDS.

CHAPTER V.

BERMUDA TO THE AZORES, CAPE DE VERDE, ST. PAUL'S ROCKS, FERNANDO NORONHA, BAHIA, TRISTAN D'ACUNHA, AND THE CAPE OF GOOD HOPE.

Leave Bermuda—Sounding round the reefs—Commence another section across the Atlantic to the Azores—Anchor off Horta, Fayal—Fayal to St. Michael's—The gardens—Foliage scenery—Visit to Las Furnas—The journey—Scenery on the road—Arrive at the Hot Springs—Return to St. Michael's—Lake of the Seven Cities—Public buildings and

streets—Leave the Azores—Arrive at Madeira—Short stay there in consequence of epidemic—Section commenced across the Atlantic to the coast of Africa—Palma, one of the Canary Islands, in sight—Sounding and dredging—Cape de Verde Islands in sight—Anchor off Porto Grande—Survey the anchorage—The town and adjacent scenery—Leave for Santiago—Anchor off Porto Praya—The town—Its natives—Dredging for pink coral—Proceed towards the African coast—Course altered for St. Paul's Rocks—The Rocks in sight—Made fast by a hawser—Crossing the Line—The old customs—The southern constellations—Arrive at Fernando Noronha—Disappointment at not being able to land for collecting specimens—Sounding and dredging—Cape Antonio in sight—Anchor off Bahia—The city—Excursions in the country—Brazilian scenery—Foliage and vegetable products—Case of yellow fever—Slaves and slavery—Leave Bahia—Section commenced to Cape of Good Hope—Island of Trinidad—Passage across the South Atlantic—The drift nets—Incidents of the voyage—Sea-birds—Loss of a trawl and its contents—The soundings—Pick up the westerlies—Tristan d'Acunha in sight—The settlement of Edinburgh—Squally weather—Visit the Inaccessible Islands—The Brothers Stoltenhoff: their story—Penguin rookeries—Dredging between the islands—The foliage—Leaving for the Cape—Table Mountain, Cape of Good Hope, in sight—Anchor in Simon's Bay—Placed in quarantine.

EVERYTHING being completed, on the morning of June 12 the mooring chains were let go, and we made a start for sea. Anchoring for the night off St. George's, the next morning, after clearing the Narrows, the pilot was discharged, and the small world of the ship left to its own resources. During the two following days soundings were taken on the "Ariadne" shoal as far as deep water, and then a course was steered by great circle for the Azores, our next halting-place, distant about 1800 miles. A southerly wind kept everything damp and unpleasant, but in spite of this it was more enjoyable than in the close water of the Camber at Bermuda.

To summarise the work of the trip across the Atlantic. Soundings were obtained from almost a level bottom, averaging from 2800 to 2100 fathoms to within 300 miles of Fayal, with a bottom temperature of 35°. Then the plateau on which the Azores rise was reached, and 1600 to 1000 fathoms obtained. Seventeen soundings were taken, and nine hauls of the trawl brought up many creatures of the greatest interest. Fayal was sighted on the 1st July, and during the day the ship anchored off Horta, the chief port of the island. A good deal of formality was observed by the health authorities, and eventually pratique was given, but the Portuguese, while anxious as to our state of health, refrained from giving us any

information as to the existence of an epidemic of small-pox on shore. This we ascertained later, when it was deemed prudent not to land; and the next day we started for St. Michael's, another of the islands, and, coasting along Pico, had a splendid view of its gigantic volcano, rising 7000 feet close to the shore, its sides richly cultivated with fields of green and yellow corn, and the white houses of the natives dotted along its slopes. For two days we kept the crater in view. On the third morning, St. Michael's was in sight, and a few hours later we anchored off Ponta Delgada, the capital, and learned with much pleasure that the town was healthy; it was therefore determined to remain a few days.

These islands, known as the Azores, lie in the midst of the Atlantic, occupying a line of about 300 miles from N.N.W. to E.S.E., and are especially remarkable for the incessant gales to which they are subject throughout the year, and, on this account, joined to that of being destitute of any port that can offer a safe retreat and shelter to vessels, they have hitherto been held in dread and avoided by the trader.

The whole range, it is evident, is of submarine volcanic formation, symptoms of which are manifest to the geologist at almost every step. Their general aspect is certainly very picturesque, presenting, as they do, a series of scattered conical hills, which are in most cases extinct volcanoes, the sides of which are now beautifully clothed with verdant heaths and shrubs. Nature appears to have been very bountiful in bestowing on Ponta Delgada all the advantages that a fine atmosphere and a pure air can impart.

In the private gardens in the immediate vicinity of the town are to be seen all the rare productions of flowers and shrubs that usually constitute our European conservatories, tastefully mingled with ornamental trees and plants of the Tropics. The great variety of palms, of cacti, dragon-trees, aloes, and others, blended with the orange, lemon, fig-tree, and lime, produce a most pleasing effect. Even the beauty of our own familiar flowers seems improved. The hydrangia, geranium, and oleander are of enormous growth; the fuchsia assumes quite an arborescent form, and the *Camellia japonica* rises up to the height of a forest tree. Sugar cane at one time was produced to a large extent, but the demand appears to have declined, and in consequence the cultivation of grain, oranges, lemons, &c. has been substituted, and to a great extent that of the vine, which now proves an extensive and profitable source of revenue. The luscious banana grows luxuriously, and is not only a great acquisition as a fruit, but also gives an extra charm to the face of the country from its beautiful and picturesque foliage.

During our stay a trip was organised for a visit to Las Furnas, distant 30 miles. The day of departure saw a curious grouping of naval and scientific men in the Plaza, which seemed to afford much amusement to the natives who surrounded them. Tents were taken, and precautions for camping out, should it be found necessary in the event of the arrival of such a party proving too much for the English hotel near Furnas.

As the party started, all the men and boys, old and young, pretty and ugly, dressed, half dressed, and undressed, and the women too, had a look at us, peeping through jalousies or boldly facing the heretic.

Our direction at first was towards the opposite side of the island, along a good road, with several villages passably clean and, judging from the number of churches, devoutly religious, gradually rising and passing through a country covered with cultivation, affording some splendid views of the district. We stopped for mid-day lunch under the shade of the hillside, with a stream of water at hand, and such a variety of ferns as would have gladdened the heart of many a collector at home. From here, shortly after, we opened out the south side of the island, and revelled, whilst descending to the coast, in scenery very like that of Sandown and Ventnor, although much prettier. At our feet a rich blue sea beating against the cliffs; around us every shade of green with a cluster of yellow corn or a clump of white houses here and there to vary the landscape. The greatest cynic must have acknowledged that this world contained something worth living for, and would have joined our party in the pure enjoyment of everything beautiful in nature.

After leaving the coast, our road lay through Ribera and another village, and shortly after we commenced to enter a country very like Dartmoor, except that it had a much richer green hue, and was more interspersed with ravines caused by the lava. Heather and flowering wild shrubs, with a dark green background, formed a pleasant country to traverse, and eventually, just as one was beginning to get tired of so much colour, the carriage drove through a gorge and opened the view on Furnas. Looking down on a large lake and cultivated valley from a height of 2000 feet is always pretty, but join to this the lovely colouring and extent of the landscape, with the addition of villages dotted about, and some idea may be formed of its beauty. Descending the hill, we entered the village of Furnas amidst an admiring and noisy crowd of its inhabitants. After a short stay here, donkeys were procured for continuing our journey. In less than ten minutes, fifteen sturdy "Jerusalem ponies" were ready, and our cavalcade again moved on.

Passing along a good road, although very uneven with several streams of water crossing our path, we came upon the shores of the lake and reached Grena. Here was the hotel, to which we were welcomed by the host and hostess (a capital specimen of an English gardener with a pleasant wife). Nothing to eat, nothing to drink, and only five rooms at our disposal, was the answer to our first inquiries. Still, the place was too pretty to leave at once; so it was determined to remain a day or two, and, if necessary, live on the "nothing." A few words with Madame in the kitchen, and the help of a donkey to the village and back, produced at 9 P.M. such a dinner as would have satisfied an epicure, wild strawberries in profusion being amongst the "nothing." A "toss" for the beds and a mattress on the floor for the loser soon arranged sleeping difficulties. The night with a bright moon and the not unpleasant music of the frogs slipped away pleasantly. Early next morning all of us had a bath amongst the rocks in a stream falling some two or three hundred feet clear from the top of the cliff. After breakfast a walk of a mile brought us to the hot springs and baths.

The largest spring is walled round, some 14 feet in diameter, and from the hissing noise and dense vapour is not unfitly called the "Mouth of Hell." Near this is a lake of boiling water about 10 feet in diameter, and close to it is a large hole "spurting" up dark-coloured mud. In addition to which there are a number of small bubbling springs omitting steam and sulphurous vapours.

Passing through a tunnel, the baths were reached, open free to all, clean, and containing twenty rooms, each supplied with a marble bath with taps for turning on hot and cold sulphur and iron water. The baths were tried, and the waters tasted, and then a move was made, this time to mount to the top of the cascade, on reaching which we found ourselves on a great plain intersected with ravines, and covered with a kind of heather. The "Iron Peak" was ahead, and, like Englishmen, to the top all must go. It was a stiff walk to reach the summit, two thousand and some hundred and odd feet above the level of the sea, but worth the trouble. The light and shade on the hillside at sunset was very pretty. Descending again, we reached Grena by a goat-path, well tired and thoroughly pleased.

The return journey was varied by a trip over the hills on donkeys, and then another twelve miles in carriages, and St. Michael's was reached, and so a most enjoyable trip was brought to a close.

We found the Plaza fast filling with people waiting for the procession and a view of the patron saint who was to bring rain, which was much wanted for the crops. The image had decorations and

jewels valued at as much as £100,000. "Master Padre" was to have come out with the saint some days previously, but the barometer was "too high," and there seemed no probability of the rain coming; so some sufficient excuse was given for delaying the ceremony until the day when rain appeared likely.

During our stay, exploring parties visited many places of interest some few miles inland, especially the Lake of the Seven Cities, on their way passing through gullies, chasms, and long deep ravines that evidently have been formed by torrents rushing from the mountains to the sea, all of which are now, by the bounteous aid of Nature, covered with luxuriant foliage and charming shrubs.

The public buildings are of but little interest. The streets are narrow, as in most southern climates, principally for the purpose of excluding the rays of the sun. Every house, of high or low degree, appears to have its latticed windows and balconies, behind which the ladies of the household seem to pass a considerable part of the day, gazing out on the passers-by.

In the course of a few years the breakwater will probably be completed; it is being carried out for some distance, and will be sufficient to shelter all the shipping that visit the port during the fruit season, which commences in November and ends in May, during which period it is usually very bad weather.


July 9.—Good-bye to the Azores, a pretty, healthy, cheap country, only requiring to be more known to make it a famous summer holiday place, with the additional benefit to be derived from its mineral springs and baths.

July 10.—St. Michael's in sight on one hand and Santa Maria on the other. Sounding and trawling, we fished up some beautiful specimens of live coral from 1000 fathoms. The rain clouds over St. Michael's testify to the efficiency of the saint's protection and his ready answer to the appeal of the people of the place.

July 13.—We are 170 miles from Madeira, with most beautiful weather and a sea of deep blue, lying 2600 fathom deep beneath us.

Madeira was reached on the 15th.

Here, as at Fayal, we were informed by the health officer that small-pox was prevalent; it was therefore decided to have no communication with the shore. The island scenery, as viewed from the ship, is certainly very charming, and one cannot help enjoying the beautiful prospect stretching out before us. As there appeared to be no prospect of landing, it was decided to proceed on our way; accordingly, on the morning of the 18th July, we left and commenced to make a section towards the west coast of Africa. The weather on the whole was very fine, and with a capital breeze in our favour



good progress was made. Still it did not deter our stopping daily a few hours for sounding and dredging purposes, depth being found from 1125 to 2400 fathoms. Palma, one of the Canary Islands, was sighted on the 19th, and sounding and dredging carried on in its vicinity. On one occasion we dredged apparently near the same spot as in the February previous, bringing up some of the dead hard coral and volcanic sand, as on the former occasion.

Thus the time passed pleasantly enough. We had found deep water day after day close up to the island of Antonio (Cape de Verde), which was sighted on the 26th. The soundings now got less, and showed that this island was connected by a ridge with St. Vincent, only 52 fathoms of water being found in some places on it. On the morning of July 27, we anchored off Porto Grande, St. Vincent, and remained until the 5th August. During this stay a survey was made of the anchorage, and the vessel filled up with coal.

What a contrast in the scenery between this place and Madeira! Here are barren rocks, and not the faintest indication of vegetation to be seen in any direction, although its formation, there can be no doubt, is precisely similar.

The town, if it can be so named, consists of a few straggling houses and the stores of Messrs. Millar and Co., the coal contractors, situated along the shore, while stretching away behind are several high, rough, and jagged peaks and mountains, affording a fine background for the barren and uninteresting coast scenery. Scarcely any supplies were to be obtained here. We left on the 5th August, and the next day reached Santiago, another island of the same group. Here we had somewhat better success, and a fair supply of fruit and vegetables was obtained.

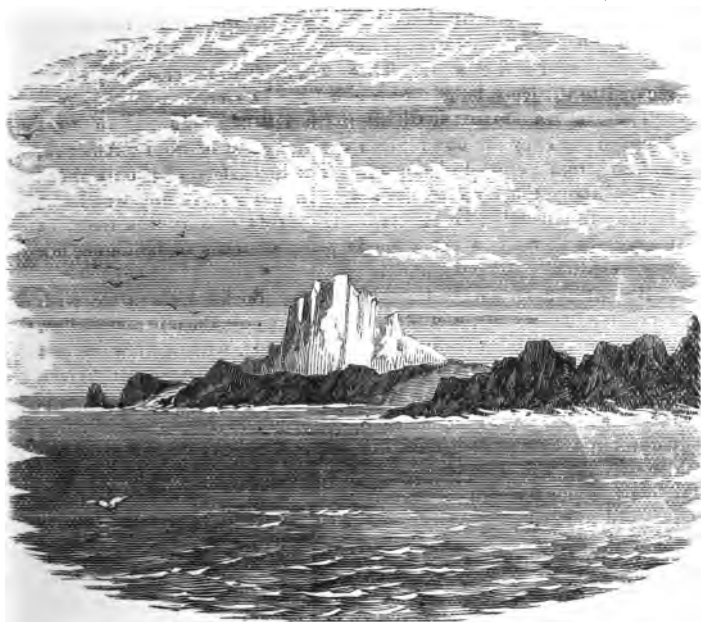
Porto Praya is prettily situated—at least it appears so from the sea—on an elevated piece of land at the extreme end of an open roadstead, which is well protected from the prevailing winds; still there is generally a long Atlantic swell setting in, which makes landing unpleasant and difficult.

Visiting the shore on one occasion under a very hot sun, the walk to the town was found exceedingly fatiguing. The roads were deep with sand, and the views obtained on reaching it anything but enticing; and any idea previously formed in its favour was soon dispelled.

The houses, with but few exceptions, are poor specimens of habitations, usually built of stone, one story high. The interiors present only a few articles of absolute necessity; of home comfort or cleanliness, in our sense of the word, they seem to have no idea.

The population appears to be made up of an intermixture of descendants from Portuguese settlers and negroes from the adjacent coast, who cultivate little patches of land in the valleys, where are produced a few varieties of tropical fruits for the market.

It was reported that a species of pink coral is found on this coast; but the result of our dredging was not very successful. A



ST. PAUL'S ROCKS.

few specimens were, however, obtained, similar to the red from the Mediterranean, but no pink.

Here we remained three days, starting on the 9th August to recommence our section towards the coast of Africa. It was now the rainy season, and each day as we neared the Equator we felt its disagreeable effects. We ran on under the favourable influence of the trade-winds, taking a line of soundings as far as latitude 3° north, when we were just off Cape Palmas, on the west coast of Africa. The south-east trades now compelled us to alter course, and we stood

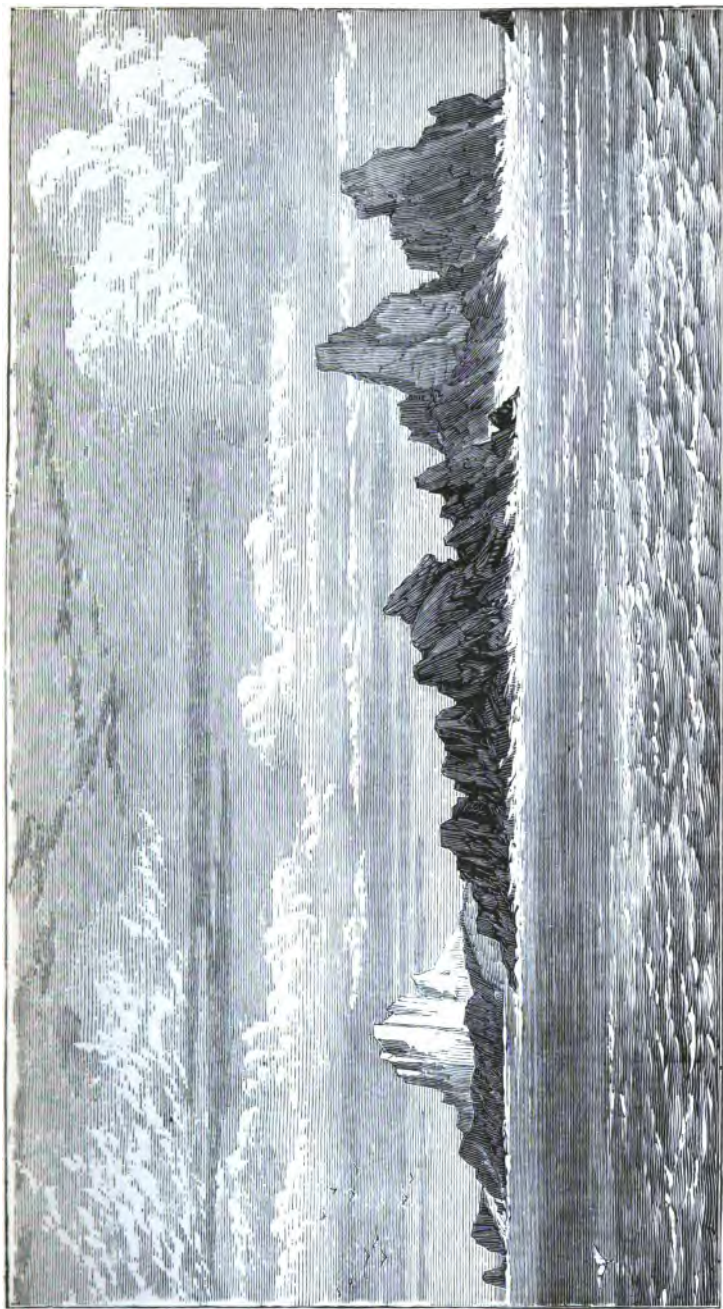
to the westward, so as to reach St. Paul's Rocks, nearly 900 miles distant. The Guinea current had been investigated; and it was found we had fallen in with the equatorial current, which continued with us until we were near the coast of Brazil. The dredgings obtained were particularly rich and interesting, and the frequent soundings showed we had been sailing over an average depth of 2200 fathoms.

On the 27th August land was reported, and as we neared St. Paul's Rocks, so the little pinnacles in the midst of the ocean became clearer and clearer. There was deep water close to; so we secured to the lee-side by means of a large hawser.

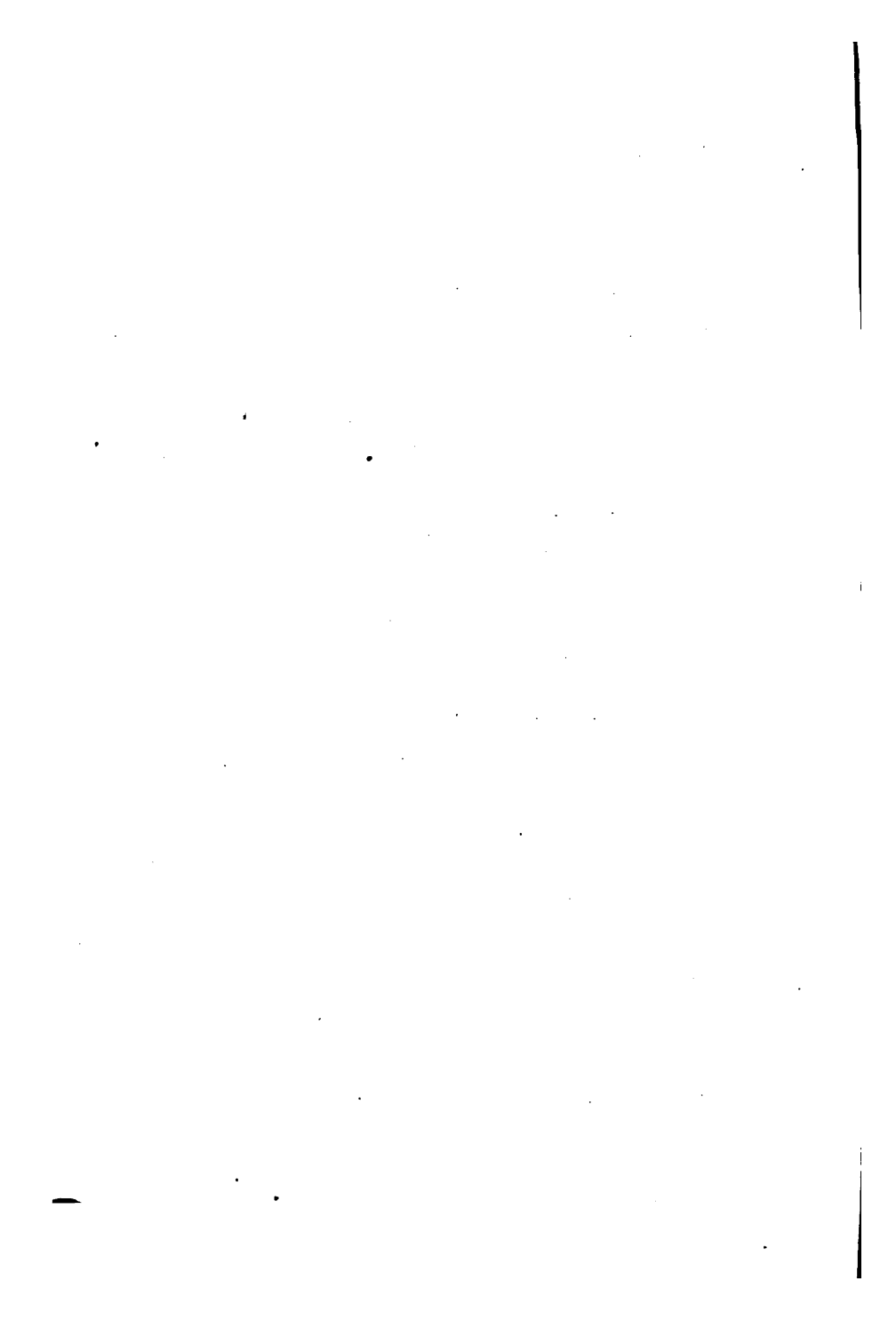
The rocks are situated $0^{\circ} 51'$ north latitude, and $29^{\circ} 15'$ west longitude. They are 550 miles from the coast of South America, and 350 from Fernando Noronha. The highest point is only about 60 feet above the level of the sea. In moderately fine weather a landing can usually be effected. Hundreds of sea-birds frequent them; but there was not a single plant or moss to be found, nor any fresh water to be obtained.

During the two days of our stay the Rocks were alive with surveyors, naturalists, and others. Fish was obtained in abundance. A thorough geological examination was made, with a view to test the practicability of erecting a lighthouse, as a monument to the memory of the late Captain Maury, United States Navy, who was the father of deep-sea exploration, and who has rendered such important aid to navigation. However, from our observations, the decision was altogether unfavourable.

On the morning of the 29th August, hawsers were cast off, and we steamed round the rocks, taking soundings and current observations; and on the next day crossed the Equator in longitude $30^{\circ} 18'$ west. The disagreeable practice of shaving, &c. those who for the first time "cross the Line" was not permitted, although there were many who were anxious to join in the usual sport. This old-fashioned custom, which the present age seems inclined to get rid of, is gradually falling into disuse, and but few ships' companies now pay that homage on entering Neptune's dominions as they were wont to. So the invisible belt was crossed; and as the night advanced, the more striking became the aspect of the southern constellations. The sparkling light of the North Star had for some time past been growing fainter, and at length disappeared altogether. On the other hand, the Southern Cross, and other stars with which we were not so familiar, had taken their places; and each night, as we moved farther south, for a time we felt a difficulty in recognising our new acquaintances.



ST. PAUL'S ROCKS, FROM THE EAST.



Though the Line had been crossed at a more westerly point than usual, on the 1st September we were enabled to sight the island of Fernando Noronha, and later in the day came to anchor in 35 fathoms. The Captain landed, and paid his respects to the Commandant, explaining the object of our visit, asking permission to survey round the island, and to explore the interior for botanical and zoological specimens. This was readily granted; but on the morrow, just as the various parties had started, a message arrived withdrawing the permission previously given; the Commandant stating that he could not, without the sanction of his government, take upon himself the responsibility of allowing any investigation, or of collecting a single insect or plant.

This group consists of two islands and several rocks, exposed to the whole swell of the Atlantic, and the surf breaks constantly and heavily on its shores. The islands are strange specimens of volcanic formation, needle-like rocks, sugar-loafed pinnacles, and overhanging cliffs.

The central peak is named the Pyramid, and is about 1000 feet above the level of the sea, the upper part of which seems to overhang the base. The islands appear to be well wooded. Trees abound on the higher parts of the land, with wondrous creepers clustering among their branches. Of fruit, the principal seem to be bananas and melons. At the present time it is used as a penal settlement by the Brazilian government, giving shelter to some 1500 to 2000 prisoners. A fort, strong in appearance, is garrisoned by a company of soldiers. It is situated about 300 miles from Pernambuco, from which place a vessel periodically calls with provisions.

The naturalists particularly regretted to let slip the opportunity of instituting a comparison of the vegetation and its organisation with that on the mainland of South America. As it was, in the first landing, a few specimens were secured; and the little that was seen was sufficient to clear up any uncertainty hitherto existing as to its geological structure, which was decidedly volcanic.

Before leaving, however, a party of the scientific staff landed at the island to the left of the anchorage, and climbed to its top, being rewarded with a fair sample of geological specimens, two or three boatswain birds, and some few plants and birds' eggs.

As a sort of *terra incognita*, Fernando Noronha was written up by nearly all previous visitors. Thus the surgeon of the *Chanticleer*, a discovery ship under Captain Foster, in 1828, writes in glowing terms of the beauties of the scenery, describing "the lovely bays, where

the rippling waves chase each other over the silvery sand, and bathe the flowerets of the skirting woods." Our impression was different—we saw none of the beauties thus described fifty years ago. Another opportunity for landing was taken advantage of by a few of us to visit the "blow-hole," directly under the citadel. With but little difficulty, a footing was effected close to the fort, by watching a favourable moment after a heavy roller, and hauling the boat up on the beach at the time; however, on leaving, it was somewhat more critical, and all got thoroughly drenched by the surf.

As nothing further could be done, it was decided to leave on the 3rd. For some twenty miles round the island, the soundings showed a rocky bottom of 800 fathoms; outside which, in a south-westerly direction, a depth of over 2000 fathoms was found, proving that a deep channel exists between this group and the Rocas.

For the following ten days the weather continued unsettled and squally. Still, very frequent soundings and dredgings were onward in depths varying from 800 to 2275 fathoms. On the morning of 14th September, Cape Antonio was in sight, 15 to 20 miles distant. This forms the eastern side of the entrance to Bahia; it is covered with trees, and the lighthouse and flagstaff on its extreme point stand prominently to the front.

On rounding the cape, the entrance to Bahia de Todos Santos lies immediately in front, with the fine town stretching away on its eastern side. The bay is full of shipping, and extends for over 20 miles northward. There are several islands at its head, and sundry rivers run into its waters. Later in the day we anchored off the public gardens, from which point a capital view of the city is to be had. It consists of a higher and lower town. The higher portion includes the suburbs of Victoria and Bomfra, and has several fine streets and stately houses, where the officials and principal merchants reside. The lower portion is devoted to commerce, and contains shops and warehouses for the sale of inland produce and foreign goods. There is a naval arsenal, but apparently of very little pretensions to size or utility. The public buildings are of no importance, except the cathedral, which is built of marble, and is said to be the handsomest of its kind in Brazil.

From the 14th to the 25th September, the period of our stay in the Brazils, although a great deal of amusement and relaxation was enjoyed, I scarcely think much of scientific interest was added to the archives of the Expedition. I must except the dredging in the bay, which led to the discovery of some new sponges, and produced an abundance of feathery starfish and a splendid specimen of the Shetland argus, a compound starfish most curious to observe when alive.

It consists of a mass of arms spreading in every direction, yet all springing from a central disc. These arms, which in some cases exceed 80,000,* are quite under control, and are expanded or closed at will. When drawn together, the animal looks like a globular basket.

Nothing could exceed the kindness of the English residents here. Free passes and a saloon carriage were given to any of us who were anxious of a trip by rail, and passes by the Brazilian steamers to the limit of their voyages.

The railway runs 66 miles along the valley of the San Francisco river, in the direction of Pernambuco, and although a bright future may be in store for its proprietors, the present receipts do not cover working expenses.

The steamers went as far as Cachoeira, distant between 50 and 60 miles, a sort of country watering-place for the Bahians. From this point the road was through a beautiful country, where the land for miles appeared to be covered with forests of fine trees of all shapes, sizes, and unknown names; while around their green borders nestle plantations and little farms, imparting to the scene a most picturesque effect.

The botanist, naturalist, and even the ordinary observer of nature, who for the first time wanders through a Brazilian forest, cannot fail to realise sensations of the utmost delight at the lavish beauty met with; all this Providence has bestowed, in an extraordinary degree, attesting the illimitable power and beneficence of the Creator. All those interesting objects that nature loves to blend may be found here. The beauty of the trees, enhanced by innumerable vine-creepers, parasites, and orchids, which shroud every trunk and festoon every path, the luxuriance of vegetation, and the elegance of the ferns, grasses, and flowers, tend to awaken in the observer a sense of his own littleness, and to force him, even in spite of himself, to acknowledge the Power that formed them.

The number of vegetable products found here is almost beyond belief. Coffee, cocoa, tea, all sorts of fruit, scents and spices, sarsaparilla, quinine, Tonquin beans, indigo, india-rubber, bread-fruit, the beautiful cashew-nut, gay-coloured apples and plants, gums, seeds, and leaves, of infinite variety and great value, everywhere abound.

Entertainments were given on board the U.S. flag-ship *Lancaster*; cricket matches were played, and arrangements made for a reception on board for the English residents of Bahia, to finish up

* Wood's 'Natural History.'

with a dance. The Brazilian Club proposed to have a ball in our honour, and the vice-president intended to follow suit, but a case of well-pronounced yellow fever stopped all these arrangements, and hurried the sailing of the ship.

During the first few days of our stay, a large amount of rain had fallen. This, succeeded by a hot sun and again by rain, formed just the forcing-bed for disease amongst the men on leave for the night, and this in a place where a glass of white rum or *kazasch* costs a penny. The ordinary seaman attacked was landed and transferred to the Portuguese hospital for fever, where he died shortly after. Capital trips were made to the gardens, or by tram-car to the convent of Solidade, where beautiful specimens of feather flowers are to be purchased from the nuns.

The humming-birds and indeed all the birds are obtained in the interior, and brought here by steamer for sale to the wholesale houses. I saw large boxes containing many thousands of each sort, all prepared and ready for exportation. Those purchased from the naturalists and "curio" dealers were not below the cost at which they could have been obtained in London.

When I was last in the Brazils (1861), slavery was in existence, although no fresh cargoes were imported. However, since October 1871, all children born of slaves are considered free. Still they are bound to serve the owner of their mother for twenty-one years under the name of apprentices. At the same time, 1600 slaves, the property of the crown, were emancipated with the proviso of remaining under government inspection, by which they are bound to hire themselves out for labour, under penalty (if found as vagrants) of forced labour on public works.

I noticed but little difference in the aspect of the blacks during the interval of my visit, although they appeared occasionally in the tram-cars. The distinction between a slave and a "free gentleman" consists in the shoes, the former being forbidden the luxury of the *chaussure*. Amongst themselves, the negroes have formed clubs to which a monthly subscription is paid, and from time to time a lottery is held. The owners of the "lucky" numbers drawn are bought from their masters for a fixed sum, from £100 to £110, and are free in the eyes of the law; but their papers are held by the club until by free labour the member has paid in the cost of his freedom.

I was informed that the slaves were not allowed to marry. Be that as it may, a walk through the streets showed me that a rapid increase in the black population was imminent. How will it end? On the one hand, an emancipated race, numbering 2,000,000, strong, energetic, and flushed with the novelty of being their own masters;

on the other hand, a mixed population of enervated, weak, sickly proprietors without labour, and unaccustomed to rule except by force. In the interior, I suspect the muscular heathen will soon change places with his late master. The attempt to colonise from England of which so much has been heard of late is simply a trap, and will only enrich its promoters at the expense of the lives of hundreds of working-men from England, for Brazil is evidently no place for English emigrants.

Brazil is always mixed up in one's ideas with diamonds; but since their discovery at the Cape of Good Hope, the market has been seriously affected here. To this depression was added the discovery of a large amethyst digging, which called adventurers to fresh fields, and soon swamped the market with those gems. Coal has been also found, and so has ironstone with 90 per cent. of iron, but not as yet in large quantities.

So it is want of population, cost of labour, absence of honesty and capital, that prevent the development of this as well as other equally favoured spots under the sun.

The time had come to make a move, and the scientific expedition steamed out of the bay on Thursday, September 25. We were bound south, to a temperature below 70°. Six stations only for sounding and dredging were decided on between Bahia and the Cape of Good Hope, much to the delight of the non-professionals, for dredging is tedious work in a strong and favouring breeze.

When clear of the land, sail was made, and with a pleasant breeze we raced on into cooler and healthier latitudes. It had been intended to sight and make a short stay off the little island of Trinidad, a rocky and barren spot, surrounded with a dangerous shore of almost unapproachable, sharp, rugged rock, over which generally a rough and turbulent surf breaks, affording security to innumerable sea-birds, for whose refuge it seems expressly formed. Owing, however, to unfavourable winds and other causes, we were unable to get nearer than 300 miles; so our course was altered for Tristan d'Acunha. During the passage the usual programme of sounding and trawling was carried out when opportunities offered. The ocean seems teeming with animated organisms. The drift nets, which are always trailing behind us, get filled in a short time with immense numbers of little living creatures, pretty-looking red and blue cockles, sea-nettle, and various other inhabitants of the deep, many of the most minute size and delicate form and tint.

In the work-room is disclosed to the observer, by aid of the microscope, an entirely new world in the economy of nature as displayed in animal life from the surface of the sea.

During the passage many events took place which, although trivial in themselves, contributed to render the voyage less tedious and monotonous. Occasionally we spoke or sighted a vessel, or fell in with a barnacle-covered fragment of timber, which was secured and overhauled for the sake of any living creatures adhering to its sides. But what seemed to impart an extra interest to our everyday life, when clear of the Tropics, was the vast number of



VIEW OF TRISTAN D'ACUNHA.

sea-birds constantly accompanying us, probably attracted by the numerous fragments of provisions thrown overboard.

Cape pigeons, those prettily marked birds about the size of doves, the majestic albatross, stormy petrels of all sizes, follow on in motley groups, never seeming to weary in their search for food. These birds appear to possess a remarkable capacity for remembering the exact time when they are likely to get a feed, for day after day, soon after noon, the vicinity of the vessel was usually animated with their shrill shrieking and fighting with each other for the dainty morsels thrown overboard.

Rapidly decreasing the distance to our next halt, on the 4th October, we trawled with one of "Hearder's" and three miles and a half of rope in a depth of 2300 fathoms; but the fates were against us, and although the rope was recovered, the contents of the trawl were so weighty that the strain carried away an iron swivel at the tantalising moment, just when the expectant philosophers were about to congratulate each other on the rich addition to their store. Unknown things are always marvellous, and the anticipated contents of *that* trawl would require an abler pen than mine to describe, judging from the conjectures as to the cause of the unusual strain, from jelly-fish in myriads to rock and stones of gigantic proportions. For the trawl to have held a tithe, it must have stretched considerably.

Sounding the next day in a depth of 2275 fathoms, the bottom temperature was recorded as 33°. This set the scientists thinking, as this is in excess of that at the Equator, and will hardly carry out the theory of the cold water of the South Pole running north at least across the distance between America and Africa.

The soundings appeared to indicate that a bank with about 2000 fathoms of water on it connects the Tristan Islands with the coast of South America. The dredgings were not quite so productive as had been previously the case. On the 6th October, in latitude 30° south, we picked up the commencement of the "westerlies," and by their influence we made short work of the 900 miles still separating us from the islands. On the morning of the 15th, land was in sight, a little speck, at first rising up dark and rugged out of the sea, growing larger and larger as we neared, terminating at length in a huge conical peak some 8000 feet in height, covered with snow.

It seems surprising that people can be found to leave associations and friends, and isolate themselves in such an out-of-the-way place as this, more remote from other inhabited places than any other settlement on the face of the globe. At the time of our visit, the population consisted of some twenty families, numbering eighty-four persons in all. Soon after our anchoring, a boat came off with seventeen of the islanders. Amongst them was Peter Green, their governor, from whom it was ascertained that they had plenty of cattle and vegetables for sale. This was welcome news, for fresh provisions are always acceptable after being a long time at sea. The islanders, however, proved, as was found out later, that they were not above trying to make a good bargain out of us, and consequently spoiled the market for themselves.

We had approached the land as near as safety permitted; and the weather promising to be fine, opportunities were taken to land.

Soon after leaving the vessel, an extensive belt of sea-weed was found encircling the island, forming a natural breakwater, and so preventing the violence of the heavy Atlantic surf breaking, as it otherwise would, along the shore.

Before reaching the land, all, more or less, got a wetting, as the rollers broke along the beach; but after a scramble all landed right enough, and made a tour of the settlement, which is named Edinburgh, in compliment to Prince Alfred, who visited here in 1867, when in command of the *Galatea*.

About fifteen houses are seen scattered over an open space on the north side of the island. There are several enclosures where potatoes and other vegetables are grown, and the islanders possess, in common, some four or five hundred head of cattle and a plentiful supply of poultry and pigs.

As the day advanced, the weather changed to wind and rain, and it was with some difficulty all got on board in safety.

During the visit to the shore, a story was told of two Germans who had been living at the well-named Inaccessible Island, 30 miles farther south. They had voluntarily exiled themselves with the hope of obtaining sealskins, but lately nothing had been heard of them, and it was supposed they had perished. During the night, the vessel was steamed across the channel, and on the following morning the land was closed, but nothing indicating life was at first seen. A boat's crew, however, landed, and in a very short time the would-be Robinson Crusoes were discovered near a little grass hut they called their home. Not much pressing was necessary to induce them to come on board, when, after a good breakfast, they were able to tell their own story, which was as follows:—

THE STORY OF FREDERICK STOLTENHOFF (THE ELDER).*

Born in Moscow, of German parents, cloth-dyers by trade, in 1846, at the outbreak of the Franco-German war, I was employed as a clerk in a merchant's office at Aix-la-Chapelle. I was called on by the government to serve with the German army, being attached to the 15th Division of the Second Army, and by the following Christmas I reached the position of second lieutenant. After taking parts in the siege of Metz and Thionville, the battalion I served in was detached south to join General Werder's army. At the finish of the campaign I was discharged and returned home.

In June 1871, my younger brother, Gustav, returned home from Tristan d'Acunha, where he landed with the crew of a *St. John's* (Newfoundland) vessel, the *Beacon Light*, which had been lost by fire about 300 miles to

* For this story I am indebted to R. R. Richards, Esq., Paymaster, who wrote it at Stoltenhoff's dictation.

the north-west of Tristan. The crew were taken from the island by the *Northfleet* (the ship afterwards sunk off Dungeness), and carried to Aden, from whence Gustav, having joined an English steamer, came to Germany.

My brother's account of the life at Tristan, and his desire to return there, led me to join him in a venture to the island, not with a view to remaining there by settling, but to endeavour to realise a sum by seal-hunting and barter. With this view, after making preparations, we left Southampton for St. Helena in the English steamer *Northam*, in August 1871, and were landed there the following month. On the 6th November we left St. Helena in an American whaler, the *Java*, Capter Manter, hailing from New Bedford, bound on a cruise in the South Atlantic. We shipped as passengers, and were to have been landed at Tristan. During the passage across, the captain's account of the settlers at the island, and the probable reception we should meet with from them, was in direct opposition to my brother's description of the place and people, after a stay of eighteen days only. Captain Manter described Inaccessible Island as a fertile place with a valley running up from the beach on the west side; and that the island itself and the next (Nightingale) were the seats of a seal and sea-elephant fishery. His knowledge was derived, so he said, from several visits to Inaccessible Island, where he had landed and seen both pigs and goats. Eventually my brother and I decided to try our fortunes at Inaccessible Island, and we were landed there by the whaler's boats on 27th November 1871. We had with us a whale boat (old), bought at St. Helena, with mast, sail, and oars, two hundred pounds of rice, two hundred pounds of flour, one hundred pounds of biscuit, twenty pounds of coffee, ten pounds of tea, thirty pounds of sugar, one barrel of coarse salt (afterwards washed away), thirty pounds of block salt, and a small quantity of pepper, eight pounds of tobacco, fourteen empty barrels for oil, five bottles of hollands, six bottles of Cape wine, six bottles of vinegar, some Epsom salts (the only medicine). We each had two blankets, some shoes and boots, and our ordinary clothes. The captain of the whaler sold us a lantern and a bottle of oil; but we had no candles. For lighting purposes we had six dozen boxes of Bryant and May's matches. We also had a wheelbarrow, two spades, a shovel, two pickaxes, kettle, frying-pan, two saucepans, and eating utensils. For arms, we were in possession of a short Enfield muzzle-loading rifle, an old German fowling-piece, two pounds and a half of powder (and to this the mate of the whaler added one pound of blasting powder), two hundred bullets, and sufficient lead with which we made one hundred bullets more; four sheath knives (such as are used by sailors), a saw, a few nails, hammer, two chisels, some twine, two or three gimlets, a door, three spars for a roof, a glazed sash for a window, and two iron buckets. Our clothes were in chests; and we brought covers which were easily filled with birds' feathers, and made good beds. On the 27th November 1871, we came ashore on the west side of the island, the whaler leaving in a quarter of an hour's time, after giving us a few potatoes

for seed—and we had brought with us seeds of nearly all the common garden vegetables. A bitch and three pups accompanied us.

My brother at once started in search of goats or pigs, climbing, by the aid of the tussack grass, the side of the cliff to the top of the island. He was too tired to return that night, and failed to shoot any game. The next day he rejoined me, and we built a hut for shelter. The whaler crew had hauled our boat up for us. After a day's rest we both in company went after game, and shot a pig, and saw but failed to get near any goats. Four days after landing we received a visit from sixteen men, in two boats, from Tristan d'Acunha—which island was cleared of men with the exception of two. The sealing season had set in, and this was their yearly visit, hastened after learning from the captain of the *Java* that we had landed and were in possession of four boxes and letters from St. Helena for the islanders. The *Java*, after leaving us, had been becalmed off Tristan, and during the night a boat had come off to her to procure supplies. The Captain of the *Java*, so the men told me, refused to barter with them, being so short a time from port.

As soon as our goods were housed, it was our intention to take advantage of the first southerly wind and fine weather to visit Tristan, and deliver the four boxes, letters, and messages from the relatives of the islanders living at St. Helena. The two boats landed at the north side of Inaccessible Island, and the men came round in their boats to meet us. Their stay, it being late in the afternoon, extended over an hour only, and during this time they behaved very well towards us, and offered assistance, teaching us how to build huts from the tussack grass. The next morning we received another visit from a dozen of them who had been in search of goats and crossed the island by land. These men helped us to build a small hut. They also explained that the position we had taken was bad, and advised us to shift to the north side of the island. Bad weather prevented any further intercourse for a couple of days; after which my brother and I crossed the hills to the north side and were shown the road down the cliff by one of the party, and the position of our future home. We returned to our first position the next day. Up to this time the Tristan people thought that we were going to return to their island with them, and showed friendly feelings towards us. Our goods were fetched to the north side by one of their boats during their ten days' stay, and we ourselves lived there with them for two days. Being anxious to obtain a cow, a heifer and a young bull, I made arrangements with Green to bring them over, if possible, and this he agreed to do about Christmas. After a stay of nine or ten days the Tristan men left for their island; they had procured only one seal.

This brings us to the commencement of December 1871. We at once set about building a house, cleared some ground, planted our seed and potatoes, and made preparation for staying some time on the island. It was summer, with fine weather as a rule; a splendid supply of water fell down the side of a mountain, within a hundred yards of our hut, and

firewood was easily procured in the wood alongside of us. The seals were landing in different spots, it being the pupping season, and we were able to procure nineteen; the skins were afterwards sold, and we were not able to make any quantity of oil. Three sea-elephants were ashore on the north side when the men from Tristan landed, but they were not captured. Our first house failed to stand the rain, the pitch of the roof being too little. This necessitated its being pulled down, and we shifted our quarters a little nearer the waterfall, our water supply. Up to this time, although hard work was necessary, we had experienced no hardship; but our supplies of rice, flour, and biscuits, were rapidly disappearing. Working on the beach every day we were unable to climb the cliff in search of pigs or goats, and thus supplement our first supply of provisions. The middle of January saw the end of the regular sealing season. In seal-hunting around the island our whale-boat, which was too heavy for two men to handle, was damaged in landing in the surf; but was yet serviceable by aid of constant bailing. We had seen nothing of our neighbours; and only a few ships passed within sight of the island, without stopping. In the beginning of April 1872, the tussack by which we had ascended the cliff close to the house caught fire, whilst we were clearing the ground below by burning, and all the tussack on the north side was destroyed. Our means of reaching game being thus cut off, and winter approaching, it became imperative to begin laying in provisions. With this view we cut the whale-boat in halves, and discarding the worst portion, succeeded in making a smaller boat, which would float in fine weather. To this specimen of naval architecture we gave the name of *Sea Cart*! By aid of the boat a visit was made to the west side of the island, whence we could climb to the plateau; and shooting two goats we salted them down. A fat pig also assisted our store, by furnishing a bucket of fat for frying potatoes; the carcase of the pig was too heavy for our boat when laden with other supplies. The meat of the wild goats we found to be most delicate and finely flavoured. In November 1871 the number of goats we counted to be twenty-three, chiefly rams. Of these, three were shot by the Tristan people, six were shot by us, and fourteen remained during the winter. The number of wild pigs was great; the boars, although of different sizes, standing in some cases as high as a sheep. Their food, other than roots and grass, is furnished in endless quantity by the birds and their eggs, of which an immense number are consumed by them. The meat of the boar is rank and uneatable; that of the sows wholesome and good. On 14th May 1872 (by our reckoning) an English ship came in sight; we lighted a fire and attracted the attention of her crew. The *Sea Cart* was not in a condition to go off to the vessel, and the look of the surf on the beach prevented the captain from attempting to land; and to our regret and disappointment the vessel made sail again and passed on. At Tristan d'Acunha her master reported that he had seen two people and a large square-sterned black boat on the beach, but that no one came off. Had we been able to communicate with this vessel, it

was not our intention to leave the island if we could have obtained supplies. The winter set in in June, the month following, but was never very severe, although we experienced a lot of rain, and heavy gales generally from the north-west. It never froze on the level of the sea; but during a strong gale from the south-east the *Sea Cart* was washed off the beach and broken up. In May our first and only crop of potatoes obtained that year was dug, and during the following months some of the other vegetables were fit for food. Unable to reach the plateau, after the loss of the boat, our store of provisions was soon so reduced, although husbanded with care, that we were obliged to diminish our allowance daily to a quantity just sufficient to maintain life; and at the middle of August we were little better than skeletons. The male penguins, forming part of a rookery about a mile from our hut, had landed at the end of July; and in the middle of August, when it became almost a necessity to resort to killing them for sustenance, the females came ashore, laid their eggs a fortnight later on the nests already formed or built by their lords, and we were only too glad to avail ourselves of this supply of food. The day previous to the penguins laying we had eaten our last potato, and were without any supply of provisions whatever. The only other birds within our reach were the night-birds, and a few thrushes and canaries; of these the thrushes only were fit for food. In the first week of September 1872 we were glad enough to sight a French bark, which hove-to off our beach, and whose captain landed after seeing our signals. We shipped in her our nineteen seal skins; and in return for a lot of eggs, her captain gave us about sixty pounds of biscuits and a couple of pounds of tobacco. Fearing the weather, the captain of this vessel did not land again, and we could not obtain any further supply. The bark was bound to the East Indies, and had she arrived a fortnight sooner, both my brother and myself would certainly have been most glad to quit our habitation. A fortnight on a diet of eggs *ad libitum* had so far restored our strength that we decided yet to remain. During the next month our food consisted of eggs and biscuits from the French vessel. In October 1872, on the 20th, a schooner (fore-and-aft) was seen standing in towards the island. She proved to be the *Themis*, a schooner making sealing voyages amongst the islands in the South Atlantic, from the Cape of Good Hope. A gale of wind drove her to sea for two days, when she returned and communicated, landing six men and boys in a boat from Tristan d'Acunha. The captain of the schooner, who landed with them, was civil, and offered me some salt pork and biscuits; we accepted about thirty pounds of the former and a small quantity of the latter. The schooner sailed the same day. Both of us were anxious to take passage in her, and intended to have done so on her return in a few weeks' time, when her captain stated he would revisit the island. The interim was to have been spent in trapping seal, the season for which had commenced. Indeed, the next day we obtained the finest skin of our collection. Although civil in making us a present of pork and biscuits, to which were added two pounds of tobacco, the captain of the

Themis declined to barter except for seal skins, and of these we were unfortunately not possessed. The men of Tristan had come over, they stated, to see what we were doing; but they had not availed themselves of the opportunity by the schooner of sending the cattle promised; and they excused themselves in different ways for not having brought them in their own boats. Several small articles were appropriated by our visitors during their stay of half a day, when they returned to the schooner and left the island. No goats or pigs were shot by them, and they promised another visit in a fortnight. During the next few days we worked hard to catch seals, with which to pay our passage to the Cape on the return of the *Themis*. The *Themis* never returned, and we were doomed to disappointment. At the end of October our supply of penguin eggs failed, and we were compelled to seek another source of subsistence. On the 10th November, our supply of biscuit and pork being exhausted, and the weather being very calm and fine, my brother and I swam around the nearest point to the eastward, with our blankets, the rifle, and a spare suit of clothes—the latter, with our powder, matches, and kettle in one of the oil casks. Stopping the night at the foot of the cliff, the next morning we both mounted by aid of the tussock grass to the plateau, and went over to the west side, and descended to the vicinity of our first abode. Here we built a hut, and, having shot a pig, enjoyed a feast of fresh meat. The next day I shot a goat, on which, with the meat of six others subsequently killed by me, we lived till the 10th December. The goats I found had increased to nineteen during the winter. Returning on the 10th December to our house, we arrived at the conclusion that our stay on the island would be prolonged, and repaired our thatch, weeded the garden, gathered the early potatoes, planted, and put things in order.

I have omitted to state that in fine weather, in summer, we fished from our boat with good success, and after her loss, from a rock to which we waded at low water, and thus changed our diet. In winter time the occasions on which it was possible to fish did not exceed three or four times; the weather and surf preventing our reaching the rock, and the fish avoided the beach during heavy seas.

Whilst on the west side during this month, we were visited by an American whaler (schooner), which sent in two boats to fish, and from her we procured five pounds of tobacco, three shirts, twenty-five pounds of flour, and six or seven pounds of molasses, in return for six small seal skins. The *Themis* was expected, or we should have gone away in this schooner. On the 19th December we were aroused by firing and shouting, to find our Tristan neighbours once more among us. They had spent nine days on the west side of the island, had procured forty seals and one sea-elephant; and two seals from Nightingale Island, where they had spent a couple of days. One of our casks on the west side they had taken to stow blubber in, and we received a small quantity of flour in exchange. After staying half an hour, they left, telling us that the *Themis* would visit Tristan the following month, and afterwards Inaccessible Island. Although anxious to leave, I was not desirous, except as a last resource, to go to

Tristan; and buoyed up by the hope, again revived, of an early visit from the *Themis*, my brother and I remained on the island. This was the last communication with us until the arrival of the *Challenger*, ten months afterwards. The Tristan men, during their nine days' stay, had shot eight of the remaining twelve goats, and expressed their regret openly that they had not been able to shoot the other four.

The *Themis* we saw at Tristan in January, but no visit was paid to us.

About the 22nd January I swam round the point again, mounted the cliff, and succeeded in shooting four pigs. From these two buckets of fat were filled. I saw the four goats, but refrained from shooting them. The hams of the pigs I threw over the cliff to my brother. On this occasion I remained eight days on the hills, paying a visit to the hut on the west side every night to sleep. At this time the albatrosses and sea-birds were laying on the top of the island, and their eggs formed a portion of my food. The young sea-birds were also palatable.

On the 1st February, the day after I rejoined my brother, a boat came across from Tristan, landed on the west side, and her crew shot or took away the only remaining four goats; for what reason it is difficult to say, as there is an abundance of food of every description, including sheep, at Tristan. Their object appeared to us to be to drive us from the island. After a detention of a day, by bad weather, the boat returned to Tristan without communicating with us; indeed, they endeavoured to avoid being seen, or so it appeared to us, who were in a measure unable to communicate with them. February passed quietly; we were living on potatoes and vegetables from our clearings, mixed with fat.

In March, our fat and potatoes being expended, another visit around the point was made by both of us in company. We discovered the loss of the goats; but shot several pigs, and lived on the west side for a fortnight. During this time, on our excursions to the top of the island, we built on the summit a small hut of tussack grass, large enough to hold one. The petrels had landed in November, and their young in April formed a capital addition to our food. It was now decided that I should remain at the top to secure a supply of pig's fat sufficient for the winter, whilst my brother lived below, and collected in a barrel the fat thrown down to him by me. After killing a pig, the hide with the fat attached was rolled up, secured by pieces of hide, and thrown over the cliff. The want of salt prevented us salting down the meat. Tobacco now failed us, and its want was much felt, both of us being heavy smokers.

My brother, on separating from me to live below, had taken three young pigs which we had managed to catch by running them down. Secured to our barrel they were towed round the point and safely landed, although nearly drowned *en route*. These were placed in an inclosure and carefully tended,* being kept for a possible dearth during winter. The pigs being small, it was possible, by means of a rope, to lower them down

* The pigs were fed on grass and green stuff generally, and penguin eggs when in season.

the most difficult places, and carry them down the easier ones. My sojourn on the top of the island came to an end with the last days of April. Returning to my brother, we lived on petrels and potatoes until the end of May. A supply of two live pigs which I had brought down with me met a watery grave in my endeavour to weather the point with them in tow. I was fortunate enough, notwithstanding the surf, to get ashore without serious injury.

Finding the supply of potatoes insufficient for the winter, on 8th June I again visited the top of the island, remaining there until the 18th August. Before parting company from my brother, we decided to shift quarters for the winter a little farther from the waterfall, and succeeded in building a house, which stood during the bad weather, and in which we were living until quitting the island.

The month of June I spent in our hut at the top, that of July in a cave—the latter the better habitation during cold weather. I saw my brother nearly every day, and unless prevented by a high wind or high surf, we could hold a sort of conversation. Gustav, whilst below, saw a large iron ship, filled with people, pass within a mile of the hut. This happened during the first lull after a heavy gale, with thick weather. When seen, the crew were employed making sail to clear the island.

During this winter we suffered no great privation, always having enough to eat, although consisting of pig's flesh only. Of flour, rice, potatoes, or vegetables, I was destitute. I had a little tea; no tobacco. My brother was no better off. As soon as the penguins began to lay, we set to work, collecting their eggs, and were living on them, chiefly fried in pig's fat, when the *Challenger* hove in sight. At this time I had left my rifle, with about fifty rounds of ammunition, in the cave. Although the piece had burst in two places, it was still in a sufficiently good condition to shoot a pig. The fowling-piece burst, and was of little use except as blow-pipe to freshen up the fire. Our knives we had lost amongst the high grass, and the saw furnished steel enough for half a dozen knives in their place. We placed the saw in a fire, and cut off the knives with our chisel, hardening the iron, then placed it in a handle, and it was ready for use. Our clothes were still in wearable order; boots and shoes we were in want of, although mocassins had taken their place. The medicine, providentially, had not been required; neither of us was sick a day. Eight or nine pounds of coffee were still left, and about one pound of tea; four bottles of vinegar remained, but their contents were spoiled. When together, the days on which we were confined to our hut by rain passed heavily. Our library consisting of only eight books and an atlas, its contents are well known by us both.

When met by the *Challenger*, our time reckoning was one day wrong. This error, I suspect, occurred soon after our landing.

The dogs left us for the penguin rookery, in spite of our efforts to secure them with ropes near the hut. They killed a large number of penguins, and I became very wild and savage, paying no attention to us. One of them appearing mad, we shot all three.

To mount to the top of the island on the west side was comparatively easy; the tussack grass was not necessary to aid the climber, the ascent being made easier by the existence of two or three ledges, on which a rest could be procured whilst walking along their extent. The lowest ledge might have been about twenty acres, the higher ones decreasing into mere shelves. The top of the island, over which we could roam for game, was about four miles in diameter, almost round; but the ground was much cut up by ravines and valleys. The whole top was covered with a poor sort of grass and sedge, and trees blown down by the winter gales; the sheltered spots only being wooded by live timber, and that of a small description.

Close to the ridge, on the north side, there was a long valley, through which the water of the cascade ran, and here my hut was situated. The cave was on a ledge lower down, on the north-east side.

To mount to the ridge on the east side, after swimming the point, great exertion and caution were necessary. Without the aid of the tussack grass it would have been impossible to mount; and even with this an hour and a half's hard work with hands and feet, and at times teeth, was required. The height of the ridge was about 1200 feet.

On the north side, the beach to which we were confined was about a mile in extreme length, and from 300 yards on the right to 200 yards on the left broad. Our hut was on the left, the narrowest part; but this was chosen on account of the nearness of the water.

A day was spent at Inaccessible Island, during which the surveyors landed and worked out the delineation of the coast, while others, "on science bent," with guns and rifles committed sad havoc amongst the thousands of sea-birds infesting the shores. The German "Robinson Crusoes" were only too pleased to leave their solitude and take passage with us. Some time was spent surveying Nightingale Island, which we found but imperfectly laid down on existing charts. During this operation, the vessel kept under way, sounding and trawling in deep water, and the opportunity was taken for a large party to land and explore the country.

The island appears to have been suddenly upheaved some 30 or 40 feet from the sea-level, and from this height to the water the rocks were full of caves and overhanging cliffs. Near the spot where the landing was effected appeared to be the highway to a Penguin rookery. It was found most difficult making any headway through the tussack grass, which from its height hid everyone who entered it, and as the ground was swarming with penguins, each of us endeavoured to make the best of his way inland, in the hope of passing through the birds' stronghold and reaching the high land. The noise was tremendous, and the odour abominable. The further we advanced the worse our position proved to be, and in a very short time the carefully arranged philosophic parties were hopelessly separated.

The grass grew to a height of several feet, and nearly every spot was covered with penguins; each step taken killed the young birds or destroyed their eggs, and the enraged parents vented their anger by incessant pecking and biting, and this continued until we reached a spot clear of grass. On leaving the rookery, large numbers of molly-mawks were met with, but, beyond making a noise by snapping their beaks, they took but little notice of us, although we passed within a few inches of their nests. The same difficulties as before were met with in returning. Still pushing on through the settlement, the rookery was passed, when, with a bold front, and at a good pace, we again hurried through the grass, crushing numbers of victims at every few steps. Eventually the cliffs were reached, and here we had some difficulty in finding even the road to the rocks, where the rest of the party had assembled. Shortly after all hands were again on board, and the *Challenger* under way, sailing towards Tristan. All this time the Professor had been busily engaged dredging, and some beautiful corals and bryozoa or plant animals were the result.

Next day was spent in trawling between Nightingale and Tristan d'Acunha, but as the hours advanced, strong breezes and dirty-looking weather came on, and in haste we bade farewell to these interesting islands, but not before we had a glorious glimpse of the cone and snow-clad top of Tristan at a distance of between 50 and 60 miles.

Only one description of tree (*Phylica arborea*) grows here, and this adapts itself to the condition of its home. In exposed places it crawls along the ground in growing, and in sheltered spots rises to a height of 15 or 20 feet. The wood of the tree is light, and, except for firewood, of no intrinsic value. Its species is not found anywhere else. Why and how it first originated in these islands is a puzzle for our botanists.

The influence of the warm stream of water coming round the Cape (the Agulhas current) was first felt off Tristan, and daily the fact becomes more apparent of its effect. Soundings were obtained in from 2000 to 2650 fathoms, with a bottom temperature of 34° to 33°. The dredging was almost unsuccessful, only a few pieces of black manganese being obtained.

The strong westerlies caused the weather to be of such a boisterous character that but few soundings were able to be obtained on this section; however, what was observed proved the existence of a deeper channel than was found on the west side by at least 600 fathoms, the temperature remaining about the same (33°).

On the 28th October the land was reported, and soon the famous Table Mountain of the Cape was visible from the deck; the thirty-

three days of our passage had now seemingly quickly passed, and we were still able easily to recall the many incidents at Bahia, and the varied scenes which had occurred in the 3000 miles just traversed over.

And now, as we near the African shore, with its outline of peculiar shape, our hopes and thoughts fly back to other lands, on the one hand thankful for successes so far, and on the other full of hope for the future. It was late in the day before we were fairly in for sounding; serials and current observations had to be taken off the Cape of Storms.

Therefore it was about 4 p.m. when we anchored in Simon's Bay, within half a mile of the shore, where Simon's Town is situated. In consequence of the case of yellow fever while at Bahia, two days' quarantine was imposed, after which all were free for a run on shore.



TABLE MOUNTAIN, CAPE OF GOOD HOPE.

CHAPTER VI.

SIMON'S BAY, CAPE OF GOOD HOPE, TO MARION AND CROZET ISLANDS,
TO KERGUELEN LAND AND THE HEARD ISLANDS, THE ANTARCTIC
REGIONS, AND TO MELBOURNE, AUSTRALIA.

Simon's Town—Kalk Bay—Farmer Peck—The drive to Wynberg—Arrival
at Cape Town—Discovery of diamonds—From Simon's Bay to Table
Bay, round the Cape of Storms—Anchor in Table Bay—The *Challenger's*
ball—Return ball by the residents—Return to Simon's Bay—Leave
the Cape—The Agulhas current—The "roaring forties"—Christmas
Day 1873—Sight and land on Marion Island—The first sea-elephant—
Vast number of albatross and other sea-birds—Kerguelen cabbage—
Prince Edward's Island—Successful trawling—Sight of the Crozet Islands
—Passage to Kerguelen Land—Arrival at and description of the island
—Landing in Christmas Harbour—Sport on shore—The result—The
Kerguelen cabbage—Leave Christmas Harbour—The scenery—Anchor
in Betsy Cove—From thence to Royal Sound—Three Island Bay—
Greenland Harbour—Cascade Reach—Hopeful Bay—Rhodes Harbour—
The seal fisheries—Return to Christmas Harbour—Penguin rookeries
—The coal-beds and Arch Rock—Cairn built to deposit records for
Transit-of-Venus party—Leaving Kerguelen—Off the southern ex-
tremity of the island—Cape Challenger—Impressions of Kerguelen—
The climate—Scenery—Plants—Birds—Seals—Animals—Fish—Coal.

THERE can scarcely be a landscape more gloomy and desolate than
the sterile rocky mountain and white sandy plains which inclose
Simon's Bay. Coming from the coast of Brazil, and the beautiful

garden scenery of St. Michael's, with its luxuriant verdure, the contrast becomes doubly unpleasing and cheerless. The town consists of about a couple of hundred of square, whitewashed houses, which are scattered along the beach, with scarcely a single tree in the neighbourhood for shelter, backed up with lofty, steep, bare hills of sandstone. The Naval Yard occupies a prominent position, and is of great service to the vessels employed on this station; here repairs are efficiently performed, and stores of all descriptions are to be obtained.

The Naval Hospital is a capital airy and well-ventilated establishment; this, together with the residence of the Commadore, and two or three churches and chapels, constitutes all the buildings with any pretensions to size.

The reminiscences of six weeks spent at the Cape are pleasant. Perhaps much of our gratification arose from the fact, that a voyage of more than a month's duration had fully prepared us to take an interest in everything appertaining to the land and its natural beauties, heightened, as the latter are, at the Cape by the simple loveliness of its flora and the bold ruggedness of its rocky scenery.

The headquarters of the *Challenger* from 28th October to 16th December were at anchor off Simon's Town (with the exception of a week spent in Table Bay). From high to low amongst the residents, everyone had a something to tell us of the curiosities of the place, and contributions of various descriptions were daily offered to the "Philosophers." A "kitchen midden" had been discovered a short way out of town, and its treasures, in the shape of skulls, bones, and stone implements, were placed at our disposal. In a word, every one became a seeker of curiosities, and therefore a capital collection was made. Trips were made to the waterfall in the vicinity of Simon's Bay and over the heights, where the everlasting flowers, wild grasses, and beautiful heather grow in profusion.

The summer season at the Cape is famous for its south-easterly winds, and these, although not very heavy or of long duration, yet interfered with our daily excursions.

A trip to Cape Town was of necessity to be enjoyed; so I availed myself of a seat in the car which runs daily to Wynberg. The first portion of the journey is devoid of interest, although not always of peril. Three long sandy beaches have to be crossed, and the sand at times is so soft that horses and carriages are driven along the edge and into the sea. However, after these dangers are surmounted, a good road is entered, leading to Kalk Bay village. This is the Brighton of Cape Town, and boasts of some decent cottages and thatched villas. Here we find a busy population of Malays

engaged in fishing operations, which employ quite a fleet of small boats. This village also rejoices in being the home of Farmer Peck, a well-known name at the Cape. The original farmer has been long since gathered to his fathers, but his name and fame survive him. He kept, and his successors still hold possession of, a noted house, half farm and half hotel, where the best of "Doctors" is to be obtained. Few pass the place without trying the medicine. Here, as indeed everywhere, one hears tales of the "good old times." The signboard over the entrance is itself a curiosity; the unknown author has long since passed away.

Refreshed by a Doctor, the hostelry is left, and a straight road runs for 8 miles to Wynberg, Constantia with its renowned vineyards lying to our left. Beyond the natural beauty of the Table Mountain, the scenery is uninteresting, until within a mile of Wynberg, when the high land seems to recede, and the scenes become more and more charming as we enter a beautiful avenue of firs rising high on either side of the road, and drive past some enticing-looking villas with well-kept gardens. This continues until reaching Wynberg, when the remainder of the journey to Cape Town is completed by railway, which runs along the high-road for some 7 or 8 miles, passing through a flat country dotted with elegant villas and stately mansions. Arrived at Cape Town, we put up at the Masonic Hotel, which just now appears to be the headquarters of Jews, diamond merchants, and successful diggers. While here, we had opportunities of seeing the town, which seemingly is destitute of any imposing buildings; even the metropolitan cathedral and the other churches being very plain. A visit to the Museum deserves more than a passing mention, for it contains a good collection of natural history specimens and many other interesting curiosities; also the South African Public Library, the Literary, Scientific, and Mechanics' Institutions, with many other establishments and societies for religious, benevolent, and industrial purposes, are each worthy of note, attesting the public spirit and enterprise of the inhabitants. The Botanical Gardens we found a most agreeable resort; they are well cared for, and tastily and prettily laid out, containing many rare, interesting, and useful plants from all quarters of the globe.

There is scarcely anything remaining to indicate that Cape Town was founded by the Dutch, and were it not for the yellow Malay faces, with their gaudy head-covering or umbrella-shaped hats, and the tawny Mestizos, who remind us of the aboriginal inhabitants, and give a complete foreign colouring, one might easily fancy we are in an old English provincial town. Generally speaking, any one

arriving here with preconceived notions of finding himself amongst Hottentots and Bushmen, or in a state of society differing materially from that of Europe, will soon find that he has been entirely mistaken, for they are only to be met with after a troublesome long journey into the inhospitable interior.

There can be no doubt that, when the English took possession (in 1806), they found that a firm foundation had been laid by the Dutch a hundred and fifty years before; but the real progress of the country and the development of its natural resources date only from the commencement of British rule. * * * Within the past few years, great impetus has been given to trade by the discovery of diamonds in the colony. But the means at present available for reaching the Fields are both difficult and dangerous; they are more than 600 miles in the interior, and from Zoutkloof to Saltpans Drift (386 miles) the road is over the Karroo Desert, which during the dry season presents considerable difficulties to travellers. Yet the waggons which start weekly are generally filled, notwithstanding the very high prices charged.

It appears that the first diamond was found by some children, who had been gathering agates and other pebbles in the bed of the Orange River. This stone (weighing $21\frac{3}{8}$ carats) attracted the attention of an inland trader, and was sent by him to Dr. Atherstone, of Graham's Town, by whom it was pronounced an unmistakable diamond of the first water. Systematic search was then made, which resulted in the finding of numerous small diamonds on the surface. About twelve months after the first one was found, the Star of South Africa, of $83\frac{1}{2}$ carats, was discovered near the Orange River by a Griqua shepherd. This caused the search to be carried on with redoubled energy. The soil on the banks of the Vaal River was dug, washed, and sorted by Captain Rolleston and party, without success for a time; but after nearly three months' persevering labour the first diamond was found in the gravel on the 7th January 1870. Within two months the party had collected some hundreds of sparkling gems. Since then, the Diamond Fields have attracted many thousands, and still continue to draw adventurers.

The area over which diamonds have already been found is very extensive, and how much farther it may extend cannot even be conjectured. Sufficient diamondiferous country is already known to provide many years' employment for a large population. Diamond-digging is certain to become a permanent industry, though, to insure its becoming a profitable one, it will be necessary to work on a different plan from that at present adopted. Larger areas of ground must be obtainable, capital will need to be employed, and

such appliances devised as will perform the maximum of work with the least amount of labour. Companies worked by skilful and intelligent managers, if backed with moderate capital, are almost certain of success.

The first diamonds found at Du Toit's Pan and Bultfontein were picked out from the mud plaster covering the walls of an out-building at Bultfontein in 1869. Shortly afterwards several Kaffirs were employed to look over the land for them. They succeeded in finding a great many small ones on the surface of the sandy soil. After searching on the surface, digging and sifting the surface soil was undertaken; next, the lime tufa was bored into, and now large "paddocks" are sunk to a depth of over 20 feet in the decomposed igneous rock.

There is a tradition among the Bushmen that in former times their forefathers made journeys to the banks of the Vaal River to procure a small white substance with which they bored holes, in the perforated stones used by them to add weight to their digging-sticks. Possibly this white substance was diamond, as the material out of which the digging implements were formed was often intensely hard. These perforated stones were afterwards handed down from father to son as heirlooms.

After completing stores, and having refitted ship, we steamed round the famous Cape of Storms for Table Bay. The 40-mile run was soon accomplished, and the anchors let go about a couple of miles from the shore. It was intended we should have gone in the dock basin, so as to have given the inhabitants of the town free run on board, but the dockmaster was afraid of our size, and the damage we might probably have caused to his jetty and bollards, if a south-easter should come on, which seemed very likely at this season; so we had to be visited at this distance, with all the inconveniences of again reaching the shore.

A ball was given during our stay in the Commercial Buildings. Our guests told us that nothing so perfect and complete had ever been held before. Concerning the decorations, they were particularly enthusiastic, for there were, as novelties, trophies of dredging and sounding apparatus, which, together with flags, flowers, and ever-greens, gave certainly a very pleasing effect. Suffice it to say, all passed off most agreeably. The following night the citizens of Cape Town gave a return ball in the same building, when everything was done by them to ensure success, and, without any flattery, nothing could have exceeded the completeness of the arrangements or the hospitality of the givers. * * * The next day the ship was swung in the bay for magnetic corrections, after which we proceeded

sight they were. It was evidently their breeding season, and so securely did they hold on to their eggs that it was with some difficulty specimens could be at all obtained. Retracing our way back, each loaded with plants, birds' eggs, and other odds and ends collected, we toiled slowly through bog and moss, heather and holes, to our first halting-place, when the photographer was met with at work under difficulties in the shape of a strong cold and piercing wind. Still onward was the order, and on reaching the beach there was met a motley group, each one loaded with spoils of the day. While the naturalists were on shore, the vessel was engaged sounding and dredging in the channel, and a portion of the day was spent in trawling. Some immense crabs were obtained from 300 fathoms, and a large fish was found in the dredge, but nothing absolutely new. When the party were again on board, and the vessel hove-to for the night, as it was intended on the morrow to land on Prince Edward's Island, but from the unfavourable appearance of the weather the idea was reluctantly given up. These islands were sighted by Cook on the 12th December 1776, in the *Resolution* and *Discovery*, and the positions he assigned to them were verified to within 2 miles by our own observation. He named the group Prince Edward's Islands, after the fourth son of the king. This name is applied now only to the north-easternmost island; that of the discoverer, to the one on which we had landed. In addition to this, four other islands to the eastward were discovered in 1772 by Captains Marion du Fresne and Crozet, of the French navy, in command of a surveying expedition. In the haze which surrounded them at the time it was thought they had discovered the southern continent, as the islands appeared to be some miles in extent, with hills rising in double and triple ranges, the summits of which were covered with snow. Stormy weather had driven the expedition away without a chance of their landing, and they therefore assigned no name to the group.

From this date very little appears to have been known or written about them until Sir James C. Ross passed them in the *Erebus* and *Terror*, in April 1840, and one was the scene of the wreck of the *Richard Dart*, from England to New Zealand, in June 1846. Out of 47 passengers, only 10 survived, who had for six weeks lived on raw birds until rescued by a party of Cape Town sealers. Hooker regrets exceedingly in his volume that the vessel he was in drifted over 60 miles in one night whilst hove-to, waiting for an opportunity to land on Marion Island. So it is probable we are the first ship of war that has had the favourable opportunity to examine and report on the group.

December 28.—This is one of the finest days we have had for some time, a cloudless sky, warm sun, and a favouring breeze sending us on at 10 knots an hour.

Yesterday's dredging in 1500 fathoms produced a large number of polyzoa (not belonging to the southern genera or to those found in Australia), several gorgonidæ, principally Isis and Mopsia, two crabs, a new sort of Macrourus with its eyes blown out, attached to the swabs, silicious and horny sponges, hydroids and plumularia.

The next day we were equally fortunate, and after dinner there were sounds of revelry in the analysing room, and all the philosophers were in good spirits, for the favourable weather had enabled the scientific staff to get through a lot of work. From a depth of 1375 fathoms the trawl has brought up an immense quantity of rarities; in fact, the haul was amongst the best as yet made: sponges, sea-spiders, many of the rare crinoids, a heap of sea-urchins, many fish, and a cuttle-fish quite new altogether, quite a mass of animal life. The bottom is light mud of a clayey description, full of globigerina or small shells. Hog Island (one of the Crozets) was being neared, and great was the preparation onward amongst our sportsmen, furbishing up guns and rifles at the prospect of a cruise on shore, the island being overrun with wild pigs, which were reported fierce and dangerous. Every opportunity was taken for trawling, and on each occasion the trawl came up well filled with numerous new specimens of deep-sea genus.

On the 31st December, after a succession of strong north-westerly winds, the first of the Crozet group of islands was seen; but the weather prevented any hope which might have been indulged in of effecting a landing; however, the islands, six in number, were all seen, and their correct position ascertained. It is over one hundred years ago that they were discovered and reported. Possessing no interest in a geographical point of view, and having no resources, they are therefore more to be avoided than approached. Very little is known about them, for Sir J. C. Ross's expedition was unable to land in 1843, and now the *Challenger's* was equally unfortunate. Later in the day the lofty mountain of East Island was seen through the haze, and on it clearing we had a good view of this perfect mountain mass of volcanic land, with its bold and precipitous shores and projecting rocks, which seem to have been formed by the unceasing action of the waves cutting away the softer parts. We stood up between the channel separating East and Possession Islands, the largest of the group, but saw no indication of tree or shrub. It was intended to make a short stay in America Bay, but the strong north-west wind prevented our reaching it

before dark, and encountering a heavy cross sea, it was not considered safe to venture nearer. A dense fog now setting in, and a heavy gale of wind springing up, it was evident we were to be disappointed; so we stood off to sea, and the opportunity of again closing the land was not afforded.

Favoured by a strong north-westerly breeze, we advanced rapidly under sail towards Kerguelen Land; on our way passing several patches of floating seaweed. We were daily accompanied by many of the great albatrosses and the large dark petrels, and still more numerous by several varieties of speckled Cape pigeons. These birds added a degree of cheerfulness to our solitary wanderings, contrasting strongly with the dreary and unvarying stillness we experienced while passing through the equatorial regions, where not a single sea-bird is to be seen, except in the immediate vicinity of the few scattered islets and rocks. The strong breeze continued, and, with a heavy north-westerly swell assisting, on the 6th January land was reported: at first a small islet, known as Blight's Cap, and afterwards the black, rough-looking coast of Kerguelen Land (or the Island of Desolation). Thick weather prevented approach to the land until the next day, when it cleared sufficiently to allow of our running into port, when the anchor was let go in 18 fathoms, in Christmas Harbour.

In this harbour Captain Cook, when in command of the expedition sent out to explore the South Seas, anchored his two vessels, the *Resolution* and *Discovery*, on Christmas Day 1777, and, although not the actual discoverer of the island, his were the first vessels to anchor in any of its numerous harbours.

This inhospitable island and its surrounding group are very little known, although discovered over one hundred years ago by Lieutenant Kerguelen, who had been sent out from France on a voyage of discovery to determine the existence of the great Southern Continent, which the philosophers of that time considered was necessary to maintain the balance of the earth. It was on January 13, 1772, that it was first seen, amidst fog and rain, when, in consequence of the tempestuous weather, landing was out of the question, and only a very cursory view was obtained of the land, when he was again driven to sea, and, on reaching France, gave such an exaggerated account of his discovery that he was sent out again the following year; and it is from his second visit that our present knowledge of the group is chiefly derived. Although Cook and Ross afterwards visited here, and added certain information, still the chart is very vague, except in the delineation of the east side of the island, which is very much cut up by fiords, forming a

chain of magnificent, well-sheltered harbours. It is thirty years ago that Ross anchored his vessels, the *Erebus* and *Terror*, in Christmas Harbour, which he describes as being nearly a mile wide at its entrance, between Cape François on the north, and Arch Point on the south, on which side is a small bay, that increases the breadth for nearly half the depth of the inlet, when it suddenly contracts to less than one-third of a mile, and thence gradually diminishes to the head of the bay, which terminates in a level beach of dark sand, extending across for a distance of 1200 feet. Here we pitched our magnetic tent for observation. The shores on each side are steep, and rise in a succession of terraces to the height of more than 1000 feet; the highest hill being on the north side, which attains an elevation of 1350 feet, and from its form received the name of Table Mountain.

The harbour is a semicircular indentation with a curious arch at its left entrance which forms an excellent landmark by which to recognise the place. Along the margin of the water were thousands of penguins, who announced our arrival in notes more sonorous than musical. At the head of the harbour, which is about a mile long, was a sandy beach fringed with kelp and sea-weed. Very little time was lost after anchoring in preparing for a run on shore. A cutter crowded with officers, "Philos," and their attendants landed, and were followed by "Fox" and magnetic instruments. On touching *terra firma* a few yards from Ross's observation station, our first curiosity was furnished by four young sea-elephants, who were speedily despatched for specimens. The party landed, spread out in varied directions, and soon the crack of the rifle was heard in every direction; birds of varied kinds, principally widgeon or teal, were paying the penalty of the advance of civilisation. Mounting a short distance, a rocky plateau was reached, from which could be seen a lake of large extent, and beyond, cliffs rising perpendicularly more than 1000 feet, with a rolling sea breaking against their base.

Collecting mosses and plants, and scrambling over hill and dale, the time soon passed until it became necessary to return to the beach. Birds of many descriptions, plants, mosses, and fossil remains of much scientific interest were amongst the collection waiting to go off.

The naturalists had procured specimens of the wingless fly and wingless mosquito. There are seventeen plants peculiar to the island, of which the botanist had obtained the whole, with but two exceptions (a fern and a plant called *Lyallia*). Of mosses a great variety were procured. The cabbage (*Pringlea antiscorbutica*) was met with in large quantities, and formed an article of diet

daily at dinner; it was found to be very palatable, in flavour somewhat like "turnip-tops."

Hooker's remarks on this natural curiosity are very interesting: *—"This is perhaps the most interesting plant procured during the whole of the voyage performed in the Antarctic seas, growing as it does upon an island the remotest of any from a continent, and yielding besides this esculent only seventeen other flowering plants. * * * The contemplation of a vegetable very unlike any other in botanical affinity and in general appearance, so eminently fitted for the food of man, and yet inhabiting one of the most desolate and inhospitable spots on the surface of the globe, must equally fill the mind of the scientific inquirer and common observer with wonder. The very fact of Kerguelen Land being possessed of such a singularly luxuriant botanical feature confers on that small island an importance far beyond what its volcanic origin or its dimensions would seem to claim, while the certainty of so conspicuous a plant can never have been overlooked in any larger continent; but that it was created in all probability near where it now grows leads the mind back to an epoch far anterior to the present, when the vegetation of Desolation Island may have presented a fertility of which perhaps this is the only remaining trace. The fires which desolated Kerguelen are long since extinct, nor does the island show any signs of the recent exertion of those powers. * * * The *Pringlea*, in short, seems to have led an uninterrupted and tranquil life for many ages. * * * The most casual inspection of the ground where the plant now grows will force one of the two following conclusions upon the mind—either that it was created after the extinction of the now buried and for ever lost vegetation over whose remains it abounds, or that it has spread over the island from another and neighbouring region of whose existence no indication now remains."

Although many varieties of birds peculiar to these regions were obtained, but few albatross were to be seen on shore.

Once more on board, on comparing notes, our first visit to Kerguelen was found to have been highly satisfactory. The photographer had obtained a dozen negatives; the artist, several interesting sketches; the botanist, all the plants except two; the naturalist, varieties of each known bird and three sea-elephants; the geologist, specimens of zeolite, quartz, crystal, and rock. Magnetisers had determined the "dip," which was reported as satisfactory, and formed a third result, with those of Cook and Ross as its predecessors; the sur-

* "Flora Antarctica," vol. ii., 'Voyage of Erebus and Terror,' 1840.

veyors had obtained observations for meridian distances and variations, heights and angles of harbour, hills and vicinity; and the sportsmen, in addition to a good day's fun, brought off nearly twenty brace of teal. All would have liked such another day's sport, but it was determined to push on while the weather was favourable, so as to make a survey of the west coast.

We left the anchorage in Christmas Harbour on the 8th January, steaming along the south coast, with the view of selecting a site for the station for observing the transit of Venus next year. The day was passed in skirting along the shore, sounding and trawling in the shallow waters. The land is made up of rough sterile rocks; the coast indented with bays and rivulets. The existing vegetation is composed of mossy grass mixed with a dirty-brown plant, while on the higher land were patches of perpetual snow. Later in the day we reached Betsy Cove, a small nook with just enough space for the *Challenger* to swing. As it was late on anchoring, only a few of the scientists availed themselves of the opportunity to land. They reported, on returning, of having seen some sea-elephants on the beach, and an iron boiler apparently left by a party of sealers, but no hut or habitation. Near at hand were several monuments, or, more correctly, wooden memorials of men who had died here belonging to whaling and sealing vessels, ranging from 1848 to 1860. The land on the left of Accessible Harbour, of which Betsy Cove forms a part, is low, with only one exception, Mount Campbell, which rises 400 feet, forming a capital landmark in contrast to the low land surrounding it.

During a stay of eight days, opportunities were taken of making excursions in various directions. The fern of the island, *Lomaria antarcticus*, which was scarce at Christmas Harbour, is found very abundant here. Heavy walking from rock to bog, skirting along the south side of a capital bay with a river at its head (Cascade Bay), searching for seal and "what not," we reached a sandy beach and fell across a sea-elephant. We left it, however, in peace, and proceeded on to where were about thirty king penguins and a second and smaller description of the same bird, besides a number of sheath-bill, prion, lestris, tern and a black petrel. Crossing the stream in shallow water, we stumbled upon the only mammal living on the island, the common mouse, evidently landed from some sealer, as its existence was unknown to Cook or Ross. After a couple of hours of heavy walking over rough and boggy ground, with a hailstorm and a piercing wind, the landing-place was reached, where all the explorers were assembled with their day's spoil. Amongst other items were three large sea-elephants,

one a male which weighed half a ton. All were taken on board and pickled in brine for preservation. One of the mice had also been caught, of which its possessor was very proud. The Professor had been dredging in the cove, and procured a mass of sea-urchins with sacks on the shell in which to hatch their young, a very rare specimen, and one the existence of which had been doubted; so there was great joy over its discovery. Cairns had been built by the surveying party on the top of Mount Campbell, in which to deposit reports for the astronomer of the Transit of Venus party.

On the 13th a sail was reported, much to the surprise of all. On the vessel anchoring near us, we found her to be the *Emma Jane*, an American sealer engaged in whaling and sealing at this and the Heard Islands.

During our stay, although occasionally the weather was very unfavourable, it did not deter the sportsmen and naturalists from their daily excursions. In some instances it was found absolutely necessary to dig birds out from the ground as you would potatoes. After tracking a hole, in all cases for several feet we were invariably rewarded by finding the nest and bird with young or eggs; they turned out to be the *Procellaria obscuris*, or popularly the white night hawk. The whole ground is perfectly undermined with holes, the majority of which contain birds and nests. Although many excursions were made in search of fur seals, very few were found by any of our party.

We learned from the captain of the schooner that the sealing season commences in October. The whale fishery is dying out, principally, I suspect, from the fact that the animals killed (in shallow water near the land) are nearly all females during the pupping season.

The mate of the schooner, a Scotsman, was an average specimen of his countrymen, "canny," "intelligent," with a sharp eye to the main chance, and no repugnance to whisky in oft-repeated doses. The crew were a mixture of Cape de Verde Islanders and Americans. The majority, I should say, had left their country for their country's good, if one might judge from appearances; however, they seemed happy and contented.

January 18.—The schooner and *Challenger* left the anchorage in Betsy Cove in the morning, and the former soon got well away to windward of us by keeping in shore. We did not fare too well, and the first watch found the ship under treble-reefed fore and main topsails and fore-staysail, hove-to with helm lashed, about 20 miles from the land. The strong wind worked itself speedily up to a heavy gale, and under sail alone we rolled and pitched about in

the turbulent sea, causing woeful destruction to furniture and crockery. When the weather cleared sufficiently, we proceeded down the coast to Royal Sound, a large inlet 15 miles from the south point of the island. The scenery was very lovely, with a labyrinth of islets interspersed over upwards of 20 miles of nearly land-locked waters, sheltered on the south side by mountainous land, which was afterwards named the Wyville Thomson range, its volcanic peak rising to 3160 feet. On the west was Mount Tizard and the towering snow-clad summit of Mount Ross, rising 6200 feet in one continuous slope from the sea, while on the north extended the Crozier range, 3250 feet in height.

Entering and steaming up the sound, we threaded our way between several islands until a schooner (the *Colgate*) was sighted, and the anchor dropped in what the sealers call Three Island Harbour.

The commander went on board the schooner, and on his return reported her captain as quite an oddity, not nearly so intelligent as those met with at Betsy Cove. He at first remarked that the *Challenger* was much out of her reckoning, he guessed; he had been thirty years knocking about this coast, and hadn't seen such a ship before. Had he got any charts? Yes, and he produced a chart of the world with Kerguelen the size of a fly. Would he come on board? Guessed he wasn't much of a ship visitor. Would he breakfast on board to-morrow, and, being Sunday, would he come to church? Guessed he hadn't been to church for thirty years, and didn't like to begin now. Was told we had been in Betsy Cove, and seen his colleague, Captain Bailey. "Where the 'blazes' did you get your pilot?" was the reply. In fact, he was altogether suspicious, and holding off to see what damage the ship was likely to do his trade.

This is undoubtedly the best anchorage we have seen on the coast. After a heavy squall, the weather moderated, and parties were away surveying, photographing, and collecting natural history specimens. The steam pinnace with a party went some distance up the sound, but although they obtained some information of the locality, the mineral springs reported to exist there were not seen. Others started to visit a fossil shell rock. After an hour and a half's walking over horrible ground, swamp to the knees, with moss and vegetation ankle-deep, and after all, on reaching our goal, not a shell or vestige of such could be seen; a couple of sea-elephants were observed, but no fur seals. Returning to the starting-point, we found the vessel had steamed a few miles down the sound and dropped anchor for the night. The next morning weighed and steamed along the coast to Greenland Harbour. Here we anchored,

the wind having freshened considerably; still the opportunity was taken to dredge, which resulted in a capital haul.

A large party landed and reported the ground most difficult to traverse; a couple of sea-leopards and ten brace of ducks were the results of the sport. Next morning weighed, with the intention of regaining Christmas Harbour, completing the survey of the coastline on the way up. Encountering very stormy weather necessitated our taking shelter once more in Betsy Cove, where, during a heavy squall, we dragged and had to let go a second anchor just in time to save our going on the rocks which surrounded us on almost every side. The next day the weather moderated sufficiently to make another attempt to reach Christmas Harbour; a persistent head wind deterred our progress, but during the day we managed to beat about 20 miles to windward, anchoring in a bay (at night), to which the name of Hopeful was given. Immediately after, our sportsmen were away to the shore, and before dark returned with twenty brace of duck. The next morning we were off again, sighting a couple of sealing schooners, on the look-out for whales, &c. Later in the day we anchored in Little Harbour—Big Bay, as the sealers call it—but to which we afterwards gave the name of Fuller's Harbour. The two schooners soon afterwards joined us; from whom we learned that they had visited Swaine Islands, and captured fifty-seven fur seal.

The two schooners were off early the next morning, but we remained for surveying. Sportsmen and naturalists were away beating the island for game, the results of which were a large number of duck and one fur seal. A few albatross were seen, and some botanical specimens obtained, but nothing new. The next morning we steamed amongst the islands of Fuller's Harbour, thence passing through an opening with high land on either side, which was named Aldrich Channel, and spending the remainder of the day in dredging and trawling along the coast towards Christmas Harbour. The Professor was in high glee. New sponges in large numbers and size, a new undescribed *Brisinga*, several fish, &c., rewarded the "Philos" for their labours; no easy work in a strong icy wind, with the thermometer at 38°. In the evening the ship entered Christmas Harbour. Naturalists and others were soon away on the search for specimens of the orange-crested penguin. Experiments were tried as to how long these birds would live under water. "Johnnies" were caught and put in lobster-pots and sunk in two fathoms of water for five minutes. The bird was found quite dead at the end of that time, and subsequent experiments showed that 1½ minute was sufficient to kill it.

Scientists to-day (January 30) visited the coal seam and curious arched rock at the entrance of the harbour; others were away seeking for opals, which are said to have their home here amongst the rocks, but nothing of the sort rewarded their researches. Mounting the high land, we were rewarded by a peep over perpendicular cliffs more than 1000 feet high, a bay of some extent stretching out before us. The effect of the scene was heightened by the cry of myriads of penguins occupying every square foot of available space on beach or cliff.

January 31.—To-day an account of our proceedings while here, together with tracings of the charts and a recommendation to establish its headquarters at Betsy Cove, was left in a cairn on the hills to the north of the entrance for the benefit of the Transit of Venus Expedition, expected to call here in September or October next. During the afternoon the Expedition turned its head south, and bade adieu to the northern part of the island. The next morning found the ship off the southern extremity of Kerguelen, a bold rugged promontory of several hundred feet in height, Cape George, which had hitherto been supposed to be the south point. But the favourable weather allowing us to steam close along the coast, a point, which was named Cape Challenger, with two curiously pointed rocks (named the twins), was observed, and this proved to be the most southern point of the island. While the weather continued favourable, we obtained frequent soundings, finding a depth of 300 fathoms only 140 miles south of Kerguelen.

The sealers had suspected shallow water from the "chopping" seas so frequently experienced by them. A fog and a head wind made laying-to necessary, with Heard Islands about 90 miles distant.

Having left Kerguelen after a stay of twenty-five days, it may be worth noting a few impressions of the place.

Climate.—The climate, speaking of the month of January, equivalent to our July in England, was healthy and invigorating, the thermometer ranging from 56°, its highest, to 38° Fahr., its lowest. The weather, when we experienced the warmth of the sun's rays, was pleasant, though it was even then misty over the hills. But on occasions, and they were frequent, when the sun was obscured, a great change was felt, and the climate on some of the most exposed parts of the north coast of England during the winter is the best illustration I can give of the sort of weather at such times. Fogs were very frequent, and the wind blew a gale (force over 6) on nine days out of the twenty-five, the barometer varying from 30° 26', its highest, to 29° 16', its lowest.

Scenery.—The island on its eastern side, the only part visited, is indented in every direction by bays running a long distance inland, and clustered with numerous islands. The mainland on the northern coast is a succession of lofty cliffs from 800 to 1000 feet high, covered with a stunted vegetation to the height of about 500 feet, above which barrenness is followed by extensive plains covered with round masses of *Azorella* (like a balsam bog), while again further inland high mountainous ranges run the length and breadth of the land, their peaks of most fantastic shapes covered with perpetual snow.

The only low land on the east coast is from Betsy Cove to the southward in the direction of Royal Sound, where some of the prettiest scenery is to be met with. The melted snow from the tops pours down the hillsides in the sea, forming cascades, or watering the plains, rendering them green and picturesque in appearance, but treacherous and difficult to traverse.

Plants.—Near the shore the *Leptenella* grows to the height of more than 12 inches, forming a velvety and slippery walking ground. The *Azorella* at Christmas Harbour was sufficiently hard to form a good footing, but it was found to the southward to be very soft and treacherous for walking over. Add to this innumerable streams of water almost covered, and the fact that the dryer ground is burrowed by birds in all directions, and it will be seen that Kerguelen offers very little inducements for a walking tour. The fern and *Lyallia* are found in patches here and there. The latter is one of the curious plant of Kerguelen, its nearest affinity being the oak and beech. The grass and cabbages are everywhere. I met the cabbage growing 300 or 400 feet up the hillside, small in size certainly, but flourishing in a rough sandy soil. The finest specimens of this antiscorbutic were seen at Island Harbour, the stalks of which were some three or four inches in thickness; these stalks the sealers treat as a turnip, and pronounce it good.

Birds.—The shag, cormorant, and penguin have a liking for the rocky ground along the coast, and but few of these varieties were met with at any distance up the bays.

In the harbours, amongst the kelp, were crowds of gull, lestris, Cape pigeons, and puffins. The chiniois, or sheath-bill, showed an affection for the shags and penguins, amongst whom they are always found. They are dirty-feeding birds, quite white, with many of the peculiarities of the pigeon, and are easily tamed. Immense numbers of *Puffinuris Urinatrix* were seen skimming along the surface of the water, apparently unable to fly. These birds, as well as the prion,

tern, and white night hawk, all live in holes burrowed deep in the Azorella or the ground. The albatross were not seen in great numbers; as at Marion Island, they were very stupid and easily killed. In running on the land, they move very much like a goose, with neck extended and waddling motion. Afloat the bird swoops down on and over the surface of the water with the greatest ease, seeming never to move its wings, an occasional use of the outer pinion being sufficient to keep the bird poised in the air. The shags were all of one species, and found in immense flocks at different places. They are stupid birds and easily captured. Not so the white gull, which maintains all the peculiarities and, to the ordinary observer, much of the appearance of its European *confrère*.

The Cape pigeons were caught in great numbers. They are pronounced somewhat tough when eaten, but not fishy. The prion were also eaten, and reported on favourably. Of penguins, there were four sorts, and, as before remarked, they were met with in myriads. Ross says, in his 'Antarctic Voyages,' that penguin soup is delicious, and closely resembles hare soup. We took Ross's word, and had some prepared, but like the "pilgrims abroad" at the Turkish eating-house, at dinner it was "passed," none being found to test the excellence or otherwise of penguin soup. The Philosophers say that very little is known of these curious birds; such a complaint ought no longer to exist. There are on board a large number in all stages of development, preserved in all sorts of ways. The duck or widgeon is without question the best biped of Kerguelen. The number met with along its shores was very large and from time to time they formed a very welcome addition to our larder.

The seals fallen in with were the sea-leopard, sea-elephant, and fur seal, and the skeletons and skins of several were preserved in casks. The wonderful elongation of the proboscis of the male sea-elephant, when enraged, is stated to be correct by the sealers; in some cases a "trunk" 8 or 9 inches in length being thus formed.

Three or four whales were sighted, "finners" and "silver-backs," but not close enough for examination.

At Island Harbour, Royal Sound, wild cats were reported, the progeny of some tame animals brought here doubtless long since when the island was a regular whaling station. There were two or three litters of young tame pigs on the islands of Royal Sound. To these animals were added two goats landed from the *Challenger* in Betsy Cove, and two others were afterwards landed at another convenient spot. The pigs, on becoming wild, soon lose their flavour, through feeding on young birds, and the flesh is usually found too

rank for food. The goats, on the other hand, improve immensely, and become a delicacy; so said the Germans at Inaccessible Island.

Fish.—Only one fish, a sort of rock cod, was caught, and the kelp near the shores was so great an obstacle that the seine was never hauled. The penguins prevented the use of the trammels, and it is likely that the scarcity of fish in the harbours may be attributed to the presence of penguin and seal. We learnt from one of the sealing captains that large quantities of fish could be quickly caught off the "Rocks of Despair," outlying dangers at a distance of 3 or 4 miles from Betsy Cove. Unfortunately, however, we had no opportunity of testing its accuracy. It follows that, excepting a few small fish brought up in the trawl, the expedition is without information on this subject.

Neither reptiles nor amphibians were found on the island.

Insects.—The insects are few in number. We found a single moth upon the tufts of *Azorella*; three beetles, one of them a handsome species nearly an inch in length, and a few others; in most respects insignificant representatives of common groups, but there is one remarkable peculiarity which they share with the insect fauna of many of the remote ocean islands—the greater number are either entirely without wings or have them in a very rudimentary form. A muscid, with the body larger than that of a house-fly, found nestling among the cabbage stalks, is totally without wings; two other small flies and the gnat are in the same condition. One at least of the beetles is wingless, and the moth is similarly situated. The only explanation offered (though perhaps not a very satisfactory one) for this peculiarity is, that from the limited area of the land, and from the frequency of high winds, insects with wings large in proportion to their bodies, with a corresponding flightiness of disposition, would be liable to be blown out to sea and so perish; how probable, one can understand who has seen the clouds of butterflies darken the sky off the coast of Brazil, and cover the sea like autumn leaves. The safe direction is therefore evidently towards winglessness.

Coal.—At Christmas Harbour some samples of coal were procured from a seam about 3 feet thick, at the bottom of a high cliff of trap rock, and close to the water. The seam was in a shale, but the coal is of inferior quality. The sealers told us that at a place in another part of the island, called the Devil's Punch-bowl, coal of a much better description is found, and 'Glass,' at Tristan d'Acunha, mentioned that this coal had been used by the blacksmith of a whaler in which he served, in preference to the ordinary "breeze" coal.

Geology.—The general structure of Kerguelen Land very much resembles that of the volcanic district of Antrim, or part of the west coast of Scotland. The interior of the island is very mountainous; consisting of a central range of volcanic peaks, the higher rising to an elevation of from 3000 to 5000 feet, sending spurs towards the various capes and peninsulas into which the country is so singularly broken up. Snow lies constantly in the gullies and in large patches on the sides of the hills above the first thousand feet. The lower and more level land consists of wide stretches of undulating morass, the soil, as elsewhere, the detritus of volcanic rocks, with here and there low, conical, flat-topped, terraced hills of a constantly repeated pattern, and shallow, marshy ponds. The coast presents a series of abrupt cliffs and headlands, 600 to 800 feet high, terraced with horizontal beds of alternately softer and harder volcanic rock, forming a striking appearance when viewed from the surrounding sea. There are large glaciers at the north end of the island and near Cape Louis. On the west coast is an active volcano, and several hot springs, but none of our party visited those scenes, from the difficulties in the way of reaching them.

Probably there is no place under the same parallel of latitude in either hemisphere which affords so scanty a field for the naturalist as this barren spot. Remote, and comparatively bare of vegetation, there are still several interesting facts connected with its botany. Though now destitute of even a shrub, the abundance of fossil remains proves that many parts were for successive ages clothed with trees, which were probably destroyed by frequent overflowings of volcanic matter, of which the remains found and the numerous beds of coal afford abundant proof. Since that period it appears to have remained in a state of almost vegetable destitution.



THE "CHALLENGER" AMONGST THE ICE IN THE ANTARCTIC REGIONS.

CHAPTER VII.

KERGUELEN LAND TO THE HEARD ISLANDS, THE ANTARCTIC REGIONS, AND TO MELBOURNE, VICTORIA, AUSTRALIA.

Passage from Kerguelen to the Heard Islands—Description of the land—Sealers met with on shore—Leave the Heard Islands—Heavy weather—Discovery of the islands—On a course towards the South Pole—A violent gale—The first Antarctic iceberg—Soundings and trawlings—In the icy regions—Icebergs and pack-ice—Birds—Cross the Antarctic Circle—Impressions of the icy desolate regions—Early explorers—Wilkes' Termination Land—Aurora Australis—Formation of icebergs—Birds seen in the southern latitudes—An Antarctic gale—Enter the pack—No signs of land—Leave the pack—Dredging—A second gale—Shape a course for Australia—Trawling—The last iceberg—Passage to Australia—Land in sight—Arrive and anchor in Hobson's Bay, Victoria—Visitors on board—First landing in Australia—Impressions of a visit to Melbourne.

UNFAVOURABLE weather having been experienced since leaving Kerguelen, McDonald Island was not sighted until the morning of the 6th February. This is the north-westernmost of the group known as

the Heard Islands, and is about 9 or 10 miles in length, and 1000 feet high. A curious thimble-shaped mound called Meyer's Rock lies a short distance from the island. A thick fog again concealed the land from us, but having bearings, we proceeded towards Young Island, the easternmost and largest of the group. The coast (when the fog occasionally lifted) presented truly a rough and desolate scene, apparently perfectly inaccessible, not presenting a point along its rugged shores where it appeared possible to land. As the roadstead was approached, the squalls came down with great violence, threatening to blow us to sea again, and it was as much as we could do to hold our own even with the aid of steam. Eventually, however, the anchorage was reached, and we moored in Corinthian Bay.

What a change! even from Kerguelen; here the ice and snow forming picturesque glaciers descending to the sea on all sides. This was our first glimpse of really Antarctic scenery. The island off which we were anchored was said to have its mountainous peak 7000 feet high. We had no means, however, of verifying this statement, for the top was never free from cloud and mist during our stay.

A small party of explorers landed on a flat beach, connected with the main land by a narrow "spur," and signalled to the ship that, although landing was difficult, it was practicable. But the weather looked threatening, and it was cloudy, cold, and windy; so no one responded. On the party returning, we learnt they had fallen in with a company of sealers established here, "living" in a couple of dirty huts sunk into the ground for warmth and protection from the gales which frequently blew with violence through the deep ravines. It appeared that there were some forty or fifty men distributed about the island in small detachments, each party having a defined beat, where they watch for the sea-elephants coming on shore. A sealer's life must evidently be a most miserable one, living in those desolate regions completely isolated from the rest of mankind. The party met with had no boat, and were entirely dependent on the return of the sealing schooners, in October next, for any further supplies or relief. They usually sign an agreement to remain for three years, at the expiration of which, if they have had a lucky season, probably they are the possessors of £50 or £60 to return home with. This is frequently spent in a couple of months, and they again return to their voluntary exile, and live on penguins, young albatross, and sea-birds' eggs for another period.

The roads (?) in every direction were swampy and exceedingly difficult to traverse. Wading through the snow and slush, and the

numerous streams from the foot of the melting glaciers, the miserable huts were reached, looking lonely and desolate amidst their surroundings. The shores for some distance were strewn with casks, tanks, sledges, old pots, débris, and the bones and remains of sea-elephants and whales.

The only new bird observed was a species of shag with white tail and spots on its wings. Five specimens of plants were procured, synonymous of Kerguelen (but not such fine species), namely, the cabbage (*Pringlea antiscorbutica*); the *Colobanthus Kerguelensis*, *Argorella selago*, *Festuca Cookii*, and *Callitriche vema*.

Several excursions were planned to be undertaken during our intended stay to visit the glaciers, the sealing station on the south point and the penguin rookeries, for these birds seemed to be in myriads, covering every ledge and precipice that afforded a footing.

All these pre-arranged plans were, however, frustrated, for during the night the barometer fell and the weather put on a very threatening appearance. The anxious circumstances under which we were placed on this inhospitable coast caused a move to be made at a very early hour on the following morning. It was snowing very heavily as we put to sea, steaming towards the shag rocks in the hope of the weather clearing.

After obtaining a rich haul with the dredge in 60 fathoms, bringing up a mass of animal life—starfish, Euryale, crinoids, Brisinga (a large number with from thirty to forty arms), and a host of familiar slugs and sea-urchins, hydroids, bryozoa—the barometer still falling, we proceeded on towards the north end of the main island, and rounded it just as a northerly gale commenced. Knowing that it would be accompanied with thick weather, it was considered unsafe to venture to the eastward of the south-east point, for the sealers reported that a shoal-spit extends from it many miles out to sea. The wind quickly freshened from the north-west, and much to our disappointment the mist never left the land; we were therefore unable to see or fix the position of the south-east point. By midnight it was blowing a very heavy gale, the ship running fast to the southward under treble-reefed topsails and reefed courses. But it was not of long duration, and as daylight came, the weather moderated, and under a bright sun and clear sky, with a favourable breeze, we sped on at the rate of 10 knots an hour, which caused us to forget the few miserable days spent at and near the Heard Islands.

Towson published his Great Circle Tables in 1847, and demonstrated that the route to Australia might be shortened greatly by following the arc of a great circle, going much farther south than had hitherto been the rule. Maury, referring to Towson's tables,

endorsed the recommendation, and in November 1863 the United States ship *Oriental*, Captain Heard, following out this course, discovered land, and in the January following Captain McDonald, in the *Samarang*, reported the existence of an island not far from the position of the land seen by Heard; other passing vessels within a few months of this date also reported the existence of land. Eventually the group received the name of the Heard Islands (the two islands individually being named Young and McDonald). Their positions were placed on our charts: McDonald Island, latitude $53^{\circ} 1' 20''$ south, longitude $72^{\circ} 31' 45''$ east; north point, Young Island, latitude $53^{\circ} 1' 30''$ south, longitude $73^{\circ} 19'$ east.

The error in existing charts, where they had been placed by observation, by the merchant ships, is 14 miles in latitude (we make them farther north) and 24 miles in longitude (we make them farther east). As a point for observing the transit of Venus, the place is most unsuited. The high land is seldom, if ever, visible, and we were very fortunate in getting a glimpse of the sun for a short time when in sight of McDonald Island, while the landing is usually only practicable about once in three days.

The masters of Australian clippers found that, although this southern course shortened the distance considerably, yet it was full of dangers from the ice, and liable to changeable winds, the westerlies usually ceasing in latitude 52° ; so, like sensible men, they adhere to a more northerly parallel, about 40° , and leave Kerguelen, Heard, and such places to the few solitary sealers and whalers in whose hands it is far better that they should remain.

The evening of the 7th found the *Challenger* fairly started on her cruise towards the South Pole. There were reports of an island about 70 or 80 miles south of Heard Islands. Mention of the fact, or supposed fact, appears in the Sailing Directory, and the sealers believe that an island is there. One man whom I heard speak of it based his opinion on the quantity of sea-weed washed on shore at Young Island after a southerly gale, and on the "land blink" observed in fine weather. An attempt to reach "this land" had been made by one of the schooners employed here some time since, which started with several captains, but returned, as Captain Bailey observed, when the "Schnaps" was all gone. They failed to find any island, and we were equally unfortunate. The barometer continued to fall and the wind to increase until midnight, when it blew most violently (barometer 29.042, thermometer 35°), the ship being under treble-reefed topsails and double-reefed courses. A more than ordinary "vindictive" sea sent its spray over the foreyard, started the weather anchor, and stove in two of the bow ports, flooding the

sick quarters. We had to heave-to and make good our damages. It was a beautiful moonlight night, with stars shining brightly, not very cold, but a heavy sea and howling winds. Sad havoc was made in the work-room amongst the bottled specimens, as broken glass and spilt spirits of wine testified.

The morning of the 8th was all that could be desired in these parts. Shake out all reefs and set top-gallant sails, with the addition, later, of a top-mast studding-sail. We have probably passed out of the "westerlies," and may expect to see ice now at any moment.

February 11.—Yesterday the ship crossed 60° south latitude at noon with moderately fine weather, but no sign of ice. During the afternoon, in a snow squall, the temperature registered half a degree below freezing; this is the coldest yet experienced, the average being 34° to 37°. In the middle-watch, ice was reported, and at daybreak our first iceberg was distant 5 miles. The berg was flat-topped, with its sides perpendicular, showing large caverns on the side exposed to us. On passing within a short distance, its height was determined to be 218 feet, and 2200 feet in length. The morning was spent in scientific work. Bottom found at 1260 fathoms, white sandy mud. Temperature of surface water 34°, bottom 32°. The trawl was put over, and several temperatures taken: these showed first a cold stratum to 50 fathoms, and then warmer to 300 fathoms, to the great surprise of our "Philos," thus putting their whole theory out of gear.

The trawl on reaching the surface was found to be foul. Two new shells, a few starfish, a new fish, apparently allied to the *Chaenichthys*, and a crustacean, were found entangled amongst the meshes, and the ship proceeded on her course.

From this time the icebergs became very numerous, and great was the excitement on board as we passed these novel sights. The rich cobalt-blue tints blending into the white of the ice produced a very fine effect, and every mile now we continued to meet icebergs of all shapes and sizes, some apparently much worn by the sea into cavities and great fissures, others of tabular form, with heavy surf breaking up their perpendicular sides.

Sailing on, we passed much loose ice, evidently fragments of broken-up icebergs; and a beautiful white petrel, *Procellaria glacis*, was seen for the first time. From this it was believed that we were in the vicinity of large masses of ice, for it is known that these birds never wander far from the main pack.

February 13.—The weather became hazy, with occasional snow-storms. Many large icebergs in sight, some of which are of magnificent dimensions, over 2000 feet in length, and from 150 to 200 feet high,

their sides perfectly smooth, as if they had been chiselled; while others exhibited lofty pinnacles, with sides and ends of many-coloured tints, leading into deep caverns open to the swell of the sea. At noon we were within 120 miles of the Antarctic Circle. At midnight the ship passed close to an extensive area of brash ice extending far away in a south-east direction. Hauled to the wind and hove-to until daylight, when a beautiful sight presented itself; we were close to the edge of the pack, which from the mast-head appeared as one solid mass without opening in any direction. The north-west wind of the previous day had apparently forced the mass tightly together.

Some hours were spent in dredging in 1675 fathoms, bottom of greenish mud. A few starfish, some small shrimps, a new echinus, a seapen, alcyonaria, a few curious crustacea and diatomaceæ were obtained. The temperature of bottom registered 32°. A new bird was seen to-day, of the petrel species, with brown wings edged with white, and white body; the white snow bird, Cape pigeons, black and white petrels, sooty albatross, and a few Mother Carey's chickens completed the list of our winged followers.

After dredging we stood on a westerly course under sail. The novelty of being surrounded with icebergs (for they were now so numerous that we had to alter course frequently to clear them), and of having on one side of the horizon a boundless field of ice, gave us intense delight. The colour of the bergs varies from the deepest blue, through green, to a dark grey. Experiments were carried out relative to the sea temperature. At the surface it was found to be 30° and at a depth of 1600 fathoms 26°. Frequent snow and sleet squalls, with an easterly breeze, the temperature of air falling to 27°.

February 15.—The day was cold and dull, temperature of air 28°. Wind light and sea calm, so made but slight progress under sail. Several large icebergs in sight, and an extensive field of pack-ice extending from the south-west. About 9 p.m., in the twilight, had a fine sight in passing close to an immense iceberg, its strange and fantastic form reflecting very brilliant blue tints in every variety of shade. A magnificent sunset caused the horizon to be illuminated with bright red streaks for over an hour, by refraction from the ice.

February 16.—The weather was remarkably fine, such as is seldom experienced in these high latitudes—bright sun and blue sky, with light winds.

Proceeding under steam, we passed some magnificent icebergs, extending in all directions and of every conceivable shape and form, the greater number with flat tops covered with snow glistening in

the sun, with smooth inaccessible sides beautifully tinted with every shade of blue and green. The position of the ship at noon was fixed at a distance of 3 miles only from the Antarctic Circle, which was crossed soon after 1 p.m. And thus another name must be added to the small list of ships which have succeeded in reaching this high latitude.

Whilst Ross, in a ship specially fitted and strengthened, reached 78°, and Cook, that wonderful Old Man of the Sea, got as far south as 70°, we had succeeded in arriving at 66° 33' south.

There are no records of any previous visitor being over the track we had chosen, and certainly a steam-vessel had never penetrated to these regions, now for the first time visited by the *Challenger*.

The sight was indeed a grand one, as we threaded our way amongst the pack-ice, and through avenues of vast icy monuments, over a course never before taken by explorers. All this left an impression of those icy, desolate regions that can never be forgotten. It is most difficult to attempt a description, for all I could say would convey but a faint conception of the reality to the imagination of one who has not been similarly situated. The weather has been exceptionally fine for these latitudes, and this has added largely to the success of this portion of the cruise of the Expedition. A lovely clear sky and a clear horizon would have shown out land had it existed within 30 or 40 miles. Proceeding into latitude 66° 40' south, the course was altered, and the Circle recrossed. The season was advancing, and whilst cruising in the Antarctic is pleasant and exciting in fine weather, the tale would be altogether a different one in a south-easterly gale.

We were now stretching along the margin of the great pack. The icebergs had become so numerous that it was not unusual to count over one hundred and fifty from the deck in sight at once, many of which were 2000 to 4000 feet in length. The temperature of the air was not very severe. At midnight the thermometer registered 26° 5'.

February 17.—Was very squally, a haze extending round the horizon, preventing anything being distinguished farther than 3 or 4 miles distant. Frequent snow-storms occurred, rendering it dangerous and difficult to navigate the vessel amongst the masses of ice; steering east for Wilkes' Termination Land, the position of which was supposed to be 440 miles distant.

This land, which was believed to exist, and which appeared on all early charts of the world as the "Terra Australis Incognita," was considered necessary to counterbalance the land known to exist around the North Pole; but such men as Cook, Ross, Weddell,

Bellinghausen, Kerguelen, and others, searched these inhospitable latitudes in vain for it.

Many years passed without anything further being heard from these regions. In 1831 the subject was again revived by Captain Biscoe reporting having seen land, and a few years later another whaling captain (Kemp) gave forth a similar statement, both these discoveries being between latitude 65° and 67° south and longitude 59° and 67° east. Captain Balleny, in 1839, reported the existence of land in latitude $66^{\circ}44'$ south, longitude 163° east. Captain D'Urville, in command of a French surveying expedition, discovered (?) Adelia Land and the Claira coast (?) about the same time; and in 1840 Captain Wilkes, in command of the United States exploring expedition, made known his supposed discovery of the great Antarctic continent, which he describes as follows:—

"In latitude $64^{\circ} 31'$ south, longitude 93° east, we made what was believed to be land to the south and west, at least so far as *terra firma* can be distinguished when everything is covered with snow. Soundings were obtained in 320 fathoms, which confirmed all our previous doubts, for on later observation a dark object, resembling a mountain in the distance, was seen, and many other indications presented themselves confirming it. Advancing to the westward, the indications of the approach to land were becoming too plain to admit of a doubt. The constant and increasing noise of the penguins and seals, the dark and discoloured aspect of the ocean strongly impressed us with the belief that a positive result would arise in the event of a possibility to advance a few miles farther to the southward."*

This to a certain extent they thought conclusive, and fully believed that an extensive continent existed within the icy barrier, extending perhaps for nearly a thousand miles near the Antarctic Circle, between the Balleny Islands and Enderby Land; but this imaginary region of vast mountains has such barriers of impenetrable ice encircling it that the probability of ever getting nearer is very remote.

The supposed existence of land was, to a certain extent, proved to be erroneous by Sir James C. Ross, the vessels of his expedition in the following year sailing over two of the positions assigned to it. For another point of this continent (?), we are now shaping a course.

During the night the southern horizon was brilliantly illuminated by the ice refracting the rays of the sun. A south-easterly wind

* 'United States Exploring Expedition.'

and an occasional snow squall made the cold to be severely felt. A large number of penguins, whales, icebergs, and the usual birds kept us company. It was particularly noticeable to-day that the sea was a deep green.

February 18.—Sailing through vast fields of brash ice, the smaller pieces of which bumped and shook as the vessel struck them. A large number of bergs in sight. Some of these great perpendicular masses overtopped our mast-head by many feet. In many places where there happened to be a break, the upper surface could be seen perfectly smooth, reminding one of an immense plain of frosted silver. Following in our track were great numbers of sea-birds, albatross, petrel, Cape pigeon, tern, &c. The cold was appreciable. Temperature of sea water was registered at 29°, and the air 23°. The green colour of the sea noticed yesterday was found to be due to marine algæ. A similar change from green to blue has again taken place.

As the day advanced, we rounded the northern extremity of the pack, and stood east, intending to run on this course for about 250 miles. This evening we had a charming view of the Aurora Australis, extending across the zenith, lighting up the heavens with a bright yellow colour, its edges tinged with purple, exhibiting at times vivid flashes of a bright pink colour. A strong light appeared behind the dark cloud, and afterwards pink, yellow, and green colours were traced along its edges. This continued for some hours, varied occasionally by the bright streams of light which darted upwards from the clouds to the zenith, forming coronæ and illuminating the scene with brilliant flashes of all the prismatic colours.

February 19.—From the great quantities of ice found drifting along our course, it is concluded that we are nearing extensive fields. Numerous bergs are in sight all day. Many and various are the discussions onward as to the formation of these masses of ice. That they are commenced on the land appears to be a foregone conclusion from the fact that earth and stones are frequently seen on them, although I am bound to admit that there was not the slightest sign of earth or stones so far as the eye could detect on any of those we met with, neither were there any signs of their having been in contact with land. Still we must suppose they had been, and that in some violent storm they probably became detached from their original place of formation, and from the prevailing winds have drifted north and west, where they are met with in every stage. Those that had been recently detached were easily detected by their beautiful stratified appearance, while others of older date had lost their primitive form by the sea constantly washing over them.

There is a great variety of opinion as to the time probably required for the formation of these immense masses of ice. Those we met with farthest south, and which showed but little sign of decay, averaged from 200 to 250 feet in height above the surface of the water (which represents only about one-eighth of the whole mass). Assuming the fall of snow to average an inch daily, or 30 feet each year, it would require more than sixty years to form one of these blocks which are found floating here in such vast numbers. The southern bergs differ so greatly from their brothers in the north, and until we have found out more about them, any opinion as to the manner of their creation is a hazard.

A few words as to one or two of the birds seen daily, by way of adding something to their history.

The white albatross (*Diomedea exulans*) was first seen October 3, in latitude $26^{\circ} 15'$ south, longitude $32^{\circ} 56'$, the nearest land to the south being Tristan d'Acunha, distant 1235 miles. The bird and its eggs were found at Tristan d'Acunha, at Marion, Crozet, Kerguelen, and the bird kept in company until a few days since.

Cape pigeons and petrels were first seen October 5, in latitude $29^{\circ} 1'$ south, longitude $28^{\circ} 59'$ west, 267 miles from Tristan d'Acunha. They were found at Marion, Kerguelen, and Heard Islands, and remain in company with us to the present.

Prions were met with on October 10, in latitude $35^{\circ} 25' 8$ south, longitude $23^{\circ} 40'$ west, 561 miles from Tristan d'Acunha. We lost sight of them after leaving Tristan group. After leaving the Cape of Good Hope, they again appeared on December 22, in latitude $42^{\circ} 21'$ south, longitude $26^{\circ} 58'$ east, Marion Islands 273 miles distant. These birds have been in our company since that date.

The Procellaria or Puffinus was lost sight of February 14, in latitude $65^{\circ} 42'$ south, longitude $79^{\circ} 49'$ east; and on the same day the white snow-bird (*Procellaria glacis*) appeared. This bird, a petrel, was only found near pack-ice, and seemingly proceeded no farther north. The petrel with brown back and wings tipped with white (species not known) was first seen on February 13, in latitude $64^{\circ} 38'$ south, longitude $80^{\circ} 20'$ east.

The penguins, after leaving the Cape, were first seen on December 24, 120 miles from Marion Islands, and from thence to the ice, on which some were seen at the extreme south reached ($66^{\circ} 40'$).

Within the Antarctic Circle were seen whales, grampus, penguins, sooty albatross, Cape pigeons, snow-birds, Mother Carey's chickens, and prions, including the new species.

February 21.—A perfect calm and favourable weather for trawling. Steaming amongst vast masses of ice; seventy-eight of these bergs

being in sight at one time. As we passed within 50 yards of one of the largest, a photograph was taken; and a shot fired from the nine-pounder at the lower part of the cliff brought down some tons of its side with a roar, making the water below white with foam and pieces of ice. Swung ship for magnetic dip.

February 23.—Clear blue sky and bright sun, weather calm and pleasant; steaming south amongst vast numbers of bergs, over eighty being in sight at one time, great tabular masses stretching along the horizon, giving one a fair idea of what the barrier must be like as described by Ross. Others were like fairy palaces of alabaster, with numerous caverns and arches supported on pillars worn round by the action of wind and water, the sea dashing through, sending its spray over all, and forming charming cascades. The dingy was lowered, and some adventurous spirits took a cruise under these lovely arches and grotto-like caverns. It is difficult to realise the wondrous effect of the colour, changing from light azure to deeper and deeper shades as the cavern was penetrated. A few small crabs, diatoms, &c., were found lodged there, probably by the wash of the waves, which were surging in and out with a roaring noise.

On the boat returning, we proceeded on, and by 4.30 p.m. the position assigned to Termination Land was only 16 miles distant, but no land was visible. Three hours later we had advanced to within 6 miles east of the supposed *terra firma* (latitude $16^{\circ} 18'$ south, longitude $94^{\circ} 47'$ east). Soundings were obtained in 1800 fathoms close up to the pack. It is unfortunate for Wilkes that Ross sailed over the eastern limits of his Antarctic land, and that now, some thirty years later, Nares fails to see its western extremity, at a distance of only 6 miles on a clear evening. Hove-to off an immense berg more than 200 feet high, and enjoyed a very brilliant sunset, which lit up the heaven, and illuminated the horizon, shedding golden rays which were again refracted from the pack, stretching away from east by north to south-west.

As the night advanced, the wind increased, and the barometer fell rapidly.

February 24.—At 4 p.m. the dredge was lowered in 1300 fathoms. The wind and sea continuing to rise, it was speedily got in before it reached the bottom; and the ship bore up under the lee of a large berg for shelter, and to reef and make sail. Either the eddy or the berg drifting caused a collision, in which we carried away our jibboom and head-gear. Some little excitement now ensued, and after removing the ice, the wreck was cleared and the ship laid-to under fore and aft sail, and steam raised. The weather had

become so thick with falling snow that the limit of vision was reduced to within one hundred yards. The wind travelling at the rate of 40 miles an hour, a heavy sea was soon raised, throwing its spray over all, so that ropes and decks were rapidly frozen over, rendering it most difficult to work the ship. With steam ready, the vessel was hove-to, drifting to leeward before the storm, with the certainty, as we were surrounded with icebergs, of sooner or later coming across the path of one of them, during the worst of the gale. About 3 P.M. all hands were suddenly called and hurried on deck; the ship was then within 200 yards of one of these great ice islands, which was just visible looming in the mist and directly to leeward of us, its frowning height towering over masts and yards. The crew worked well, and by dropping and setting a close-reefed maintopsail aback, with the engines going at full speed astern, the danger was avoided. After this we endeavoured to use our enemy as a breakwater, but the violence of the gale caused a difficulty in bringing the vessel head to wind; so there was no other course but to continue our drift amidst fog and snow. As the evening advanced, and during a momentary lull in the storm, while passing to leeward of another great berg, the ship was brought round on the other tack. The passage between the two icebergs was now proved to be clear of danger, and the night was spent in drifting backwards and forwards from one to the other, the steam-power enabling the vessel to hold her way. As night came on, matters looked very uncomfortable, but the weather cleared and the wind commenced to drop soon after midnight. Still it was a very critical time, and all felt glad when daylight arrived, as we were then enabled to shape a course for the pack under sail. From the direction the wind had been blowing, the ice at its edge was scattered and sufficiently open to allow the vessel to push through it to within 15 miles to the westward of the supposed position of Termination Land; although having a clear horizon, no indications of it could be seen. So Wilkes' vision was at fault, and the great Antarctic continent has turned out to be a Cape Flyaway. We sailed for two or three hours, picking our way amongst the blocks of loose ice, which varied in size from 5 and 6 feet to 60 feet across, and seemingly some 20 feet in thickness. Most of it was washed into varied fantastic shapes and forms, showing evidence of decay from the length of time it had been floating about in the water. A beautiful sight from the mast-head, the extensive ice-field stretching away before us as far as the range of our vision, the immense number of great bergs scattered in every direction. Some of the discoloured pieces of ice were packed up for microscopic examination. Not a whale, not a seal, not a

penguin, to be seen. Our solitary companion was a lestris. Having now proceeded as far south as practicable in an undefended ship, at noon course was altered to east, which means north-east by north down here. On reaching clear water, studding-sails were set, and we were off for Australia, Cape Otway, 2278 miles distant. The weather was getting unsettled; it was therefore deemed useless to remain in proximity to so much ice, as a strong southerly breeze had sprung up, of which advantage was taken, and it was considered that any further stay in these icy regions would not only be attended with danger to the vessel, but would cause a delay in time which was required for other services.

February 26.—The weather looking promising, the day was devoted to science. Soundings were found in 1975 fathoms, bottom yellow mud, with a temperature between 34° and 31° , the surface water being 32° . Then the trawl did its duty and brought up several small stones, an umbellularia, four small fish (species known), a large serolis, and many starfish, during the trawling. Serial temperature at 100 fathoms showed the temperature $31^{\circ} 8'$, and both at 150 and 200 fathoms 34° . Five P.M. saw us with a falling barometer and wind rapidly rising from a force of 3 to that of 9. Weather thick, with snow squalls, and night approaching. Steam was got ready in all boilers, and after close reefing and furling every sail but the spanker, the vessel was steered close to leeward of a large iceberg, and kept in position by the aid of steam close to the mass. An anxious time, for the howling wind kept rushing down from the top of the berg, threatening to blow us away from our friendly breakwater, but we were just able to hold our own, and at daylight made sail and stood to the northward in a gale of wind with a heavy turbulent sea. The white albatross and black night-hawk appeared again to-day.

March 2.—Another "shake" last night, and let us hope the last one. About 3 P.M., the ship going from 7 to 8 knots, two points free, with thick weather, the look-out man reported his impression that in the haze he thought he saw ice ahead; at the same time, "Iceberg right ahead!" was shouted. The order was given, "Hard aport, let fly the main-sheet!" There was no confusion and no unnecessary noise. Answering her helm readily, the vessel only just cleared the berg and was becalmed under its lee. Had she struck, the consequence would have been serious, if not fatal. There was no time to call "All-hands!" or do anything more than was done, and trust that the ship's head would pay off in time. Thanks to

"That sweet little cherub that sits up aloft,"

she did so.

March 3.—The weather had so far moderated that opportunity

was taken to trawl. Sounded in 1950 fathoms, and then procured a lot of deep-sea fauna, including three umbellularias, some holothurians, shrimps, and sea-anemones. Only one small iceberg kept in our company throughout the day.

On March 4, in latitude $53^{\circ} 17'$ south, longitude $109^{\circ} 23'$ east, we passed our last iceberg; still the water remained of sufficient low temperature for them to float about without melting until the 50th parallel of latitude was attained.

Whenever the weather permitted, we sounded and trawled with good success; upon investigating the results, they consisted of nearly the same description of fauna already found farther north.

March 13.—The last scientific work before going into port is being carried on in 2600 fathoms (bottom temperature $32^{\circ} 5'$). This was some 600 fathoms deeper than had been found since leaving the Cape, and the bottom consisted of red clay with modules of manganese.

The weather continued very variable as we proceeded north, and not until reaching latitude $44^{\circ} 30'$ did fine weather greet us. Then with a favourable westerly breeze good progress was daily made.

March 16.—Land in sight! the first for forty days. Cape Otway, Australia's south-western point, was ahead, and the bright light glimmering in the darkness of the night. A short distance farther, and we are reminded that our voyage will soon be at an end. Early the next morning we crossed the bar, and, passing through the narrow tideway and amongst several islands and sandbanks which lie within it, we emerged upon Port Phillip harbour, an inland lake of nearly 40 miles extent, on which are situated Geelong, Queen's Cliff, Williamstown, Melbourne, and a host of other minor towns and villages; an hour or so later and we anchored in Hobson's Bay, off one of the finest cities in the English colonies. Numerous influential citizens immediately boarded the vessel to congratulate us on our arrival, and offering every assistance and a cordial welcome to Australian waters.

From the anchorage we got a splendid view of the harbour with its manifold life and movement. Coasting steamers were arriving and departing; yachts and steam launches glided over the blue waters filled with pleasure-seekers and excursionists; boats laden with cargo were crossing the harbour, and square-rigged ships were being towed in, while others were unmooring to proceed to their several ports with their outward cargo—all this bearing testimony to the activity and importance of the vast trade of our colonial empire.

Near us were a large number of vessels at anchor, and several of

the most magnificent clipper ships in the world lay alongside Sandridge Pier, where are warehouses, stores, factories, and docks; and beyond this were seen villages half hidden among the sombre-tinted woods; while stretching away as far as the eye can reach lay the great mass of the city, broken here and there by church spires and high roofs. Massive buildings, which ere long we learned were the City Hall, new Post Office, Government House, Parliament Buildings, and Treasury, and a host of others, were seen panoramically spread out in view, causing us to pay a tribute of wonder and admiration to the energy of our Australian cousins.

On landing, we found everything typical of home. The faces and voices of the people on the pier were English and familiar, and on taking our seats in the railway carriage for Melbourne (which is 3 miles off, and for which free passes had been supplied), the right-hand of good fellowship is held out, we are taken charge of by our visitors with an alacrity of civility and lavish hospitality from which there seemed no escape.

On reaching the city, I was much impressed with its brilliancy: the shop fronts, the imposing width of the streets and side-walks, the breadth and depth of the watercourses, which were in many places bestridden with light iron bridges, the number of places of amusement, the saloons and restaurants, all crowded, the noisy street cries, the immense number of pedestrians thronging the thoroughfares. And this was Melbourne, 17,000 miles from home! I could not help paying my tribute of wonder and admiration at its marvellous progress.



DREDGING ON THE PARAMATTA RIVER, SYDNEY.

CHAPTER VIII.

MELBOURNE (VICTORIA) TO SYDNEY (NEW SOUTH WALES) AND WELLINGTON (NEW ZEALAND).

Melbourne—The city and suburbs—Visit to Ballarat—The city—Its gold mines—Trip up country—The drive—Hospitality and welcome—Melbourne to Sydney—First sight of Sydney Heads—Arrive at Sydney, New South Wales—Anchor in Farm Cove—Sydney harbour—Paramatta river—Picnic on Mount Victoria—Zigzag on the Great Western Railway—The Blue Mountains and valley of the Nepean—The city and suburbs—The dredging picnic—Entertainments during our stay—Early history of the colony—Leave Sydney—The stormy weather—Return and anchor in Watson's Bay—Sydney to New Zealand—Daily soundings—Rough weather—Anchor for shelter in Port Hardy and Queen Charlotte Sound—Man washed overboard and drowned—Sight Palliser Heads—Anchor off Wellington—Port Nicholson.

ONCE again at sea, with the land of the Southern Cross disappearing behind us. What a varied round of pleasures and enjoyments the last three months have furnished! Australia was declared by

those who had been stationed there to be the naval officer's paradise, and many a yarn was told on the passage out of the pleasures and hospitality that were sure to be experienced on our reaching the Elysium; and I think now, on looking back, all must say that their anticipations have been more than realised, and the months of March, April, and May 1874 are amongst the happiest of one's naval career.

Melbourne first gave us impressions of the vast territory, not inaptly called Greater Britain. Gaiety and pleasures soon drove away thoughts of southern discomfort and icebergs, and it was difficult to satisfy the calls on the members of the Expedition for their presence at entertainments or their assistance at semi-scientific gatherings. Of my trips around Melbourne, the commercial capital of the Australian Colonies, descent of the mines and reception at Ballarat and Sandhurst, I shall speak of hereafter.

Victoria is the wealthiest of all England's colonial possessions; her trade exceeds thirty-two millions per annum, with a yearly revenue of four millions and a half, that is, an income far exceeding the revenues of Portugal, Denmark, Saxony, and many of the other monarchies of Europe.

Melbourne has made a name for herself, and is undoubtedly the capital not only of Victoria but of all Australia; and though only just forty years have elapsed since the first white man landed on its site in 1835, it has already, with its suburbs, 247,000 inhabitants; in other words, it may be classed as the ninth city in the British Empire, exceeding, as it does, in population such ancient cities as Bristol and Edinburgh. It is adorned with fine public buildings, and possesses all the comforts and luxury of a European capital.

The fault, if any, in the design of the town, which is built in parallelograms or blocks, is a common one. Still its internal appearance is very fine, and the streets are all broad, straight, and arranged at right angles to each other. Running east and west are Great Flinders Street and Collins Street, which is the Broadway of the city. Then there are Swanson and Bourke Streets, each filled with handsome business premises, theatres, opera-houses, churches. In fact, it is impossible for any one to walk its length and breadth without being struck by its grandeur and dimensions.

The public buildings, especially the Post Office, are fine and in good taste. The Club is a most comfortable place, well kept and quiet, and the banks showed outwardly at least that their shareholders are "warm men." The warehouses and private residences are also remarkable for their size and architectural

beauty, and contribute to the general stylish appearance of the city.

The greater part of the large revenue of Victoria is derived from the public lands and from the state railways (the annual taxation is 43s. per head of the population), and of this revenue nearly one-third is expended on public instruction, that is, on public schools, universities, libraries, picture galleries and museums, schools of art and mining, and various literary and scientific institutions. This fact is, I believe, without parallel elsewhere. The universities and colleges possess talented professors on their staff in the various branches of science. The museums and national galleries are filled with interesting specimens of local and world-wide fame and with paintings of the highest merit. The free libraries, with thousands of volumes on their shelves, are open to all comers. The residents of this Greater Britain are, no doubt, proud of their institutions; but they are justified in their pride.

The Botanic Gardens, well stocked with all that is beautiful in flowers, plants, ferns, and lovely trees, are of themselves a perfect paradise to those interested in botanical studies.

The suburbs, including Richmond, Brighton, and St. Kilda, are lovely spots; the foliage, the charming villa residences, with glimpses here and there of the bright blue sea, all tend to complete a very pleasing picture, while away in various directions lie the public gardens or reserves, as they are named, affording green walks and shady retreats, and materially assisting in maintaining the health, and contributing to the pleasure of those whose business may keep them all day in the city.

Such is this truly wonderful place, a city which has risen to its present proud position as if by magic; but it is only another evidence of the energy and perseverance of the English race.

During our stay in Victoria, every opportunity was afforded us of seeing all of interest, and of joining in many pleasant excursions. Amongst others was a trip to Ballarat. Four hours' run by rail, and the destination was reached which, since the gold fever of 1853, has been metamorphosed from a few canvas tents to an extensive and beautiful city. From the discovery of the riches of Golden Point—the first opening of those famous “jewellers' shops”—the progress of Ballarat has been steadily onward.

The city numbers about one hundred and twenty streets, many of them containing handsome buildings. Their great breadth and regularity of plan are the main cause of the stylish appearance of the city, and the gentle undulation of the ground on which it is

built gives charming views in every direction. But the rate of progress has not been confined to the limits of the city, for thousands of acres all round are under cultivation for agricultural purposes, where many of those who spent their early colonial days in mining are now, after their toil, content to settle down in the bliss of having a farm of their own, and of sitting under their own vine and fig-tree.

Opportunities were afforded for visiting some of the famous gold-mines in the immediate neighbourhood, one of which, belonging to the Black Hill Mining Company, situated at the foot of the hill which gives the company its name, on the banks of the river Yarrowee, was particularly interesting: here is a most complete and novel set of machinery. The steam-engine, a horizontal one, of 100 horse-power, is placed in the centre of the works, and drives six batteries of ten stamps each. The quartz is supplied to the stampers by a self-feeding apparatus, when it is reduced sufficiently fine to pass through wire gratings, at the back and front of the machine, having one hundred and twenty holes to the square inch.

A small quantity of mercury is put into each stamp-box twice a day. The crushed quartz is then carried through the grating by a stream of water into ripple troughs containing mercury, extending along both sides of the battery, and thence over some twenty-four feet of blanketing; the material collected by this process is conveyed into revolving barrels, with half its weight of quicksilver, sufficient for proper amalgamation. Heat is then applied, the mercury evaporated, and from the residue is collected the gold, which is afterwards taken to the bank or assay-house. The working manager was very communicative, and from him I ascertained that the mine occupied the principal portion of the Black Hill, and contains about forty acres. Tunnels, 9 feet high by 7 feet wide, had been excavated at different levels, amounting in length to over 3000 feet; these tunnels are connected at several points with the open workings at the top of the hill.

Mining operations were in a depressed state at the time of my visit, but a few years before they were crushing here their 2000 tons of quartz per week, yielding, on an average, about fifty grains of gold per ton of quartz. * * * From here drove for a couple of miles, reaching the scene of the Winter's Freehold Mining Company; and having an introduction from Mr. J. Morrison, the manager, there was no difficulty in seeing everything of interest. At first I was struck by the appearance of the surroundings, from which I was led to imagine (from the tumble-down appearance, &c., of everything) that it was not the rule amongst mining companies to

waste money in needless buildings, or useless ornamentation—the test of success being in their handsome dividends. I intended going down this mine, but time did not permit, so had to be content with a walk over the surface. The workings are from 300 to 400 feet deep; four layers of bluestone, varying from 5 to 25 feet in thickness, were cut through. The machinery consists of two engines of 25 horse-power, one used for pumping and winding, and the other for puddling. At the time of my visit very few hands were employed, the funds of the company having run low, and the results of their findings being very small; but I ascertained that, when fairly under weigh, work was carried on in three shifts day and night. The cuttings, or wash-dirt, is sent up the shaft in iron buckets, then by means of the steam-driven puddling-machines the useless is separated from the good; a stream of water is now let into the head of a long wooden trough, in which a ribbed false bottom and movable cross-bars are placed; the puddle stuff is wheeled to the head of this trough in barrows, thrown in, and worked backwards and forwards until the whole is thoroughly disintegrated; the large stones passing over the false bottom, while the heavy gold, falling through, is caught on the cross-bars, the smaller gravel passing to the bottom, when it is collected by Chinamen and trucked to the waste heap. Several hours are consumed in this washing process; and I was informed that some years ago they used to net about 120 ounces of gold a day: then the gold used to be lifted out in bucket-fuls, for final washing and weighing, before removal to the bank. The process is efficient, though it seemed to be rude, and the time spent in sightseeing here was one of rare interest and curiosity.

Tunnels have been cut in various directions in search of the precious metals. * * * When these golden deposits had their origin, and when the great successive layers of bluestone were thrown over them, are amongst those lost incidents in the history of creation concerning which science can do no more than speculate. The extent to which these great quartz boulders have been rolled shows that they had been carried a very much greater distance than the ranges to which we ascribe their origin; or that they were shaken to and fro in some great convulsive struggle of nature, such as the earth has not experienced since man came upon it from the hands of the Creator. Four successive layers of basaltic rock have over-run at long intervals and buried the golden stream of an ancient world; and so changed has the crust of the earth become since the last of these great seas of molten rock passed over the land that the craters whence they issued have themselves become lost. The stories of these waves of fire and smoking floods are epics of the

grandest order. And now, after long ages, in these calm and settled days, when our earth is unshaken by the war of the fierce elements, she holds these rich treasures in her bosom, and we probe our way through the thick rocks and recover from the beds of these ancient streams the precious metal hidden there, perhaps, when the first great fiat went forth, and the waters were parted from the land, and out of chaos a new planet sprang into being, at the command of God. * * *

Driving around the country along capital roads, we passed through suburban villages which compare in attractiveness with any to be met with elsewhere. The houses are mostly built of wood, with deep verandahs and spacious porches, all more or less ornamented with a profusion of clematis, jessamine, and other flowering creepers, rejoicing the eye, and casting a green and pleasant shade over all. Every homestead has its neat and well-kept garden attached, and although the summer was passed, there were enough of lovely flowers, plants, and trees remaining to make the scene a perfect one.

Our colonial acquaintances, during the drive, took the greatest pleasure in impressing us with the vastness of their country, and the solidity and good management of their various institutions, and although the work of sightseeing and interviewing day after day was somewhat fatiguing, yet the information gained and the pleasure experienced of the marvellous results achieved by British energy amply repaid all.

Abundance seems a characteristic feature of our colonists, and go where we will are abundant evidences of their unbounded hospitality. It hardly needs to go far from the city to realise such, but perhaps to see it in perfection, it is necessary to leave Melbourne with its conventionalities and go "up country" for a few days. Invitations had reached the ship for such a trip, and making one of a party, all arrangements were completed, and we started in the best of spirits, accompanied by some of our colonial friends.

The drive was all that could be desired, through some of the best settled and pleasantest country of Victoria; our friends entertaining us on the way with a description of all the properties along the road, their history, value, and the number of stock they would carry, for some of the undulating country was rich and park-like, sprinkled over with gaunt, grey gum-trees and numberless fantastic-looking shrubs, from whose boughs echoed the scream of cockatoos, parrots, parakeets, love-birds, and endless others of gorgeous plumage. Occasionally we came upon a neat little log cabin in which the recently arrived emigrant and his family were

trying their fortunes in this promising country; sometimes upon a more pretentious house surrounded by garden and orchard fenced in; then again through pretty little villages with their church spire peeping up behind the neat villa residences; and now reaching a long grassy plain, our journey ended at a large bungalow nestled amidst a shrubbery and garden, where several joyous faces were awaiting to welcome the naval strangers. We were soon made at home, and the short time spent in that happy household will never be forgotten.

The delight of this country life with its freedom and healthy climate, where is seen to perfection the true colonial character of our Australian cousins, was doubly attractive to us who pass so much of our time on the deep, deep sea. Our stay, however, could not be of long duration, and the time was therefore made the most of. We were shown everything of interest, the farm, the run with the thousands and thousands of sheep, and the gardens, and entertained with a right good welcome. The end at last came, and we parted with great regret from those kind friends who had extended to us such hospitality.

From Melbourne we sailed on the 31st March, getting glimpses, as we steamed out of Hobson's Bay, of the once famous city of Geelong, prettily situated on the western arm of Port Phillip, of St. Leonard's, Queenscliffe, and Lonsdale, passing over the calm extent of a vast inland sea between the two narrow promontories of Point Nepean and Lonsdale, and entering Bass's Straits, Wilson Promontory, the southernmost point of Australia, stretched out before us.

A pleasant week passed, with fine weather, during which frequent hauls were made with dredge and trawl. Passing Cape Howe, the coast-line appeared steep, rocky, and covered with monotonous forests of gum-tree. As we drew nearer, the grandeur and size of the cliffs and heights became more and more apparent. On their tops could be discovered little specks of white houses dotted over bright green downs.

Twofold Bay looked charming with its pretty villages nestling along its shores. The soundings here showed a rapid descent of one in six, from 40 fathoms to 2000 fathoms. Closing on the land, a few hours were spent off Montague Island for magnetic corrections, and after dredging we proceeded for Sydney harbour.

Those who had been on the Australian station were eagerly questioned by the uninitiated as to the distance we had still to go as each successive bay or headland was passed; and all those whose duty permitted were on deck watching the progress of the vessel

over the calm sea. But what seemed to arrest our greatest attention was the apparently impenetrable wall of high land stretching away on either hand till sea, land and sky blended in the blue distance, and were lost in one another. But we were told there existed an entrance in this wall leading into a beautiful, commodious, and, in fact, the most perfect harbour in the world; and were it not for the fact of the vessel heading direct for this seeming barrier, no one would have believed it contained such an opening.

Passing each successive bay, we began to get a clearer view of the land, and as we drew nearer, the houses and villa residences on the cliffs showed our proximity to some large town.

And now the Sydney Heads with the entrance between them were clearly discernible, through which we passed about mid-day. Our course even now appeared blocked by the rocky face of the Middle Head jutting out into the blue water, its sides covered with a confused mass of brushwood, grass, and gum-trees. This appeared to divide the harbour into two arms. Proceeding to the left, we steamed round the South Head, and so up a long reach with high land along the coast and white sandy beaches glistening in the sun. Every here and there, the scene was enlivened by the white walls of some villa residence, and along the summit the lighthouse, flagstaff, and a few houses stood out clearly defined. Our course now took us very near the north shore, and so we had a capital view of its vegetation, which commenced immediately above the rocks, and comprised grasses, low shrubs, and trees of many sorts. Rounding another point, we entered the waters of Port Jackson, and the lovely view which now presented itself, with the handsome villas standing amongst trees and gardens along the shore, was enchanting; while numbers of yachts, boats, and steamers were cruising about, for it was Easter Monday and high holiday. Certainly, it appeared so for the people of Sydney; every bay, from the noted one of Botany to the smallest in the harbour, having its quota of pleasure-seekers, and the weather being fine combined to make the whole scene one of the prettiest possible to imagine.

We were now 7 miles up the harbour, and had passed Fort Macquarrie, Darling Point, and Garden Island; a short distance farther, and we were reminded that our voyage is ended; the anchor is let go in Farm Cove. Here we found H.M.S. *Dido* and the German frigate *Arcona*, while scattered over the harbour were numberless merchant vessels of all nationalities.

Sydney harbour is frequently the theme of praise and eulogy, and it certainly deserves most of what has been said in its favour.

The fine view afforded from the anchorage with its pretty surroundings was very enjoyable. To the left is a lovely little bay, its shores surmounted with shady walks, leading to the beautiful parklike reserves of the Botanical Gardens, possessing trees and shrubs of rare beauty, flower-beds, and conservatories, which contain interesting collections, and form all that could be desired for public resort among the manifold beauties of nature.

The right-hand shore of the bay is picturesque and rocky, and on the heights runs, within a paling, an extensive undulating lawn, at the top of which stands Government House in a position of great beauty. This castellated building of freestone has an air of magnificence about it such as should belong to the residence of the governor of so important a colony.

On first landing in Sydney Cove, one cannot help being struck with the many fine buildings rising in all directions, including wool stores of five and six stories, the Custom House, and numerous hotels. Behind all this appear the roofs of shops, and above these again dwelling-houses and villas; but the highest point of all is covered with grassy slopes, and the buildings and gardens of the Astronomical Observatory, with its tower, time-ball, and attendant flagstaffs stands out in bold relief.

I despair of being able to convey to the reader my own impression of the beauty of Sydney harbour. I can call to mind no other place with such lovely glimpses of nature—nothing equal to it. Many beautiful scenes are to be met with in our own British Isles, but they dwarf into insignificance in comparison with this magnificent land-locked expanse of water and scenery spread out before us, extending in bays, coves, and rivers for some twenty miles inland, ramifying in every direction; its bold and rocky shores presenting a succession of picturesque and beautiful landscapes, in which every nook and headland is studded with elegant villas and snug cottages, surrounded with park-like grounds and gardens, full of orange-trees, bananas, and numberless semi-tropical plants, unfamiliar to the eye of the newly arrived stranger.

Endless facilities are afforded for all kinds of yachting, boating, and fishing, which are in high favour. Capital regattas and races are frequently held. The two yacht clubs make a very good show as regards numbers, build, management, and speed, though in tonnage they rarely exceed 40 or 50 tons. The harbour is usually safe for boating parties, though southerly bursters and other sudden squalls are often fraught with risk to the inexperienced.

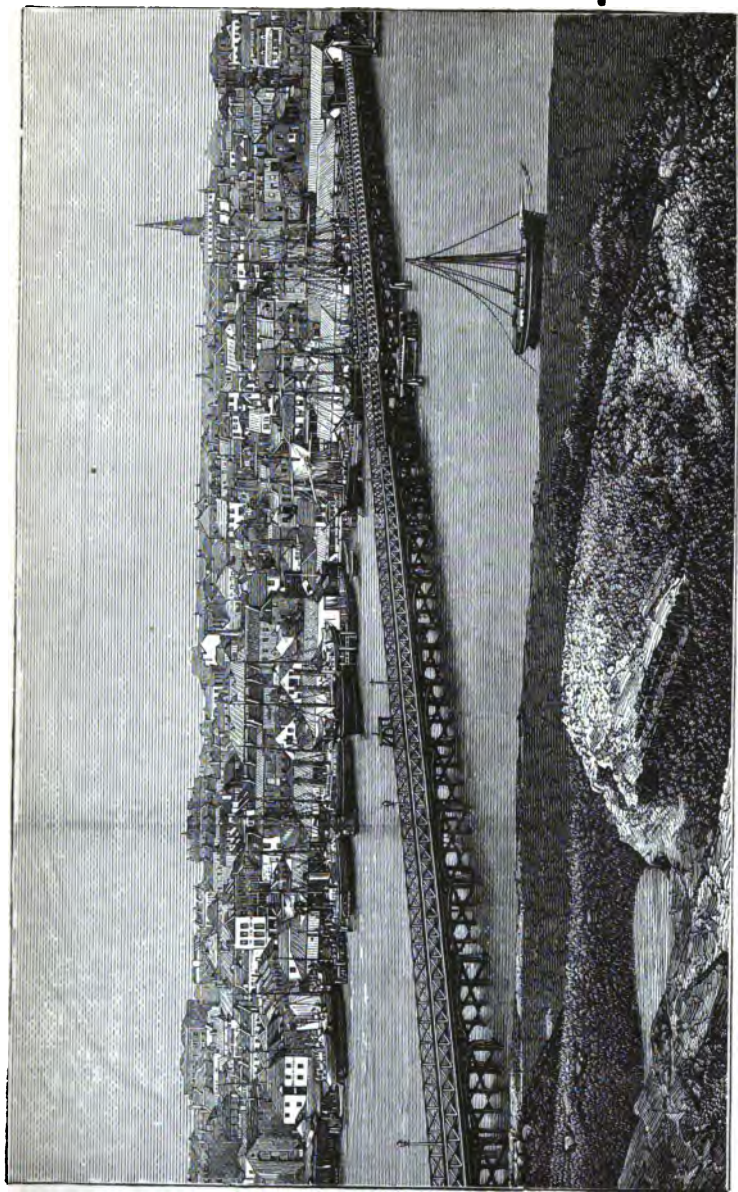
The eastern shore of Darling Harbour, which skirts the western side of the city, has its frontage entirely occupied with wharfs and

quays. Here all the intercolonial steam companies have their stations; while ferry-boats run in all directions to the north shore, to Balmain, St. Leonard's, and higher, to the township of Pyrmont, and so for some 8 miles up the lovely Paramatta river, passing Cockatoo Island, where is situated the government dry-dock, in which we were on the 20th April successfully placed, and had sundry repairs, &c. The dock is 400 feet long, with 20 feet depth of water over the sill. Workshops are provided, with an extensive plant of modern machinery, so as to be enabled to undertake any repairs to the vessels on the station.

The scenery on the shores of this river is very charming. The sea runs up into various little bays and coves, indenting the land all around, so as to give a thousand different aspects of the water, broken with rugged little islands and cliffs and rocky, tree-covered shores, dotted here and there with pretty villas, and then water again, and then again land.

I have no recollection of seeing in any early work on this colony reference to the delightful scenery of Sydney harbour, or of the many navigable rivers near it, nor is much said of the glorious ranges of the Australian Alps or the defiles of the Blue Mountains. But there are scenes of nature here at hand as lovely as are to be met with in any part of the world. They are certainly in some cases difficult of access, and must so remain until the population is large enough to stretch about the country and to construct railways. One of the greatest achievements in railway engineering in Australia is the zigzag line over the Blue Mountains, which challenges admiration for its handsome appearance as well as for the stupendous character of the undertaking.

A few days after our arrival, through the courtesy of the members of the government, arrangements were made for a trip over this interesting portion of the line, in company with several of the officers from the German frigate *Arcona*. A special train left the city station at 7 o'clock with a large party, all intent on a pleasant journey. The first few miles we passed through orangeries, vineyards, and here and there were seen snug little homesteads. The line ascends 1 in 3, until reaching Blacktown, when it gradually descends, until Penrith is reached, which is 34 miles from Sydney and 88 feet above the sea-level. Here, at a convenient siding, breakfast was provided, and after a short delay we were speeding on again; the ascent now being very rapid, as we began scaling the Blue Mountains, which rise abruptly on the west side of the valley of the Nepean. The line, on reaching the summit of Lapstone Hill, follows a winding course on the main



SYDNEY, FROM PYRMONT, DARLING HARBOUR.

range, and for 60 miles it pursues its tortuous way along the top of mountain ridges until it gains an elevation of 3758 feet. Stretching away here on both sides of the line, is a vast expanse of mountainous scenery, presenting a scene indescribably grand. The route we are running on is the only passable track over the mountains, the sides of which are covered with tangled vegetation, forest trees, and a profusion of flowering shrubs. Reaching the zigzag by which the line is taken along the face of a precipitous cliff, we descend into the Lithgow valley. The portion of the line over which we had travelled is said to have cost in construction from £20,000 to £25,000 per mile. It was only after an exhaustive survey of different proposed routes that this point was fixed upon as the least difficult for making the descent; but so rugged even was this place that those engaged upon its survey had to be lowered down the cliffs with ropes, to enable them to measure and peg out the line. Two or three gorges on the route are spanned by pretty white freestone viaducts, and one projecting rock is pierced by a tunnel.

Amidst this charming scene we remained some time, the naturalist, botanist, and others rejoicing in the beauties of nature unfolded before them. Retracing our way back by rail to Mount Victoria, where a capital lunch had been prepared during our absence, in a large building adjoining, ample justice was done to the good things provided, and, after a few toasts and speeches, the train was once more in motion, and we were speeding on towards Sydney, where we arrived late in the evening, all highly pleased with our pleasant course.

The ground on which Sydney is built undulates considerably, giving a picturesque effect to the whole town, although, perhaps, interfering somewhat with its appearance of regularity. Sydney, therefore, is not a beautiful city, and never can be, although it contains within it much that would be considered handsome by those who admire street architecture. The original wooden houses, once existing, have almost entirely given place to buildings of brick and stone or stone fronts, and the old resident points with pardonable pride to the splendid edifices rising in different parts of the city, including banks, the Town Hall, new Post Office, insurance offices, &c.

In the principal business quarter the buildings are stately and the shops large and handsome, with costly fittings, and plate-glass fronts, in which are exposed all the articles of taste and luxury necessary to minister to human requirements at prices hardly in excess of those we are accustomed to at home.

As a matter of course, there are the back streets, where cheap shops abound—cheap restaurants, billiard saloons, and drinking bars; streets also of offices and wholesale stores; streets of workshops, and others where wooden shanties and shaky-looking tenements are the rule. Amusements for the people abound everywhere: theatres, operas, dancing and music halls, skating-rinks and bowling-alleys; every class can here find some sort of pleasure suited to its taste and means.

Most of the best streets and localities are named after old and popular governors—such as King, Macquarrie, Blyth, Hunter, and Phillip Streets. Amongst these, Macquarrie Street takes the pre-eminence, containing the Houses of Assembly, the Treasury Buildings, the entrance to Government House, the residence of the Naval Commodore, the Mint, and the old Hospital; but none of these buildings present any features in design worthy of attention, being all of old date; the buildings, however, erected within the last ten or fifteen years have really some architectural pretensions. Its fine banking-houses, mercantile establishments, and handsome public edifices give the town an aspect bespeaking substantial wealth, advancing cultivation, and enterprise. The portion near to the quays contains many of the best buildings for commercial purposes. The majority of the banks are on the west side of George Street, and these, with the extensive blocks of spacious and handsome warehouses in their neighbourhood, give a distinctive character to that section of the city. In Pitt Street are many of the best hotels and club-houses; and here is situated the Exchange, a large stone-built erection, with columned front of the Corinthian order. The new Post Office occupies a space between George Street and Pitt Street, and is a building of exquisite proportions, noble in its general outline and sumptuous in detail. Another fine edifice is the Town Hall, the foundation-stone of which was laid by Prince Alfred when here in the *Galatea*. The Museum, containing a fine collection of Greek, Roman, and Egyptian antiquities, is situated on the eastern side of the city, and is a massive building, most imposing and effective in point of appearance and design. But the finest specimen of architecture Sydney displays is the University, a noble stone building in the Perpendicular style, extending some 400 feet in length, situated on the top of a neighbouring eminence, forming a conspicuous and handsome feature in the Sydney landscape. The principal courts of justice are in King Street and at Darlinghurst. The first-mentioned, where the civil business is transacted, is a large rectangular building of brickwork, with arcaded front, decorated with Doric architecture. The court-house at Darlinghurst, for criminal trials, is a fine stone

building of the Doric order. In the rear is the gaol, occupying a large area, and built with spacious wards radiating from the centre. The private buildings or residences in the neighbourhood of Sydney are of a superior character, and are generally in the vicinity of beautiful recreation grounds. The fashionable quarter *par excellence* is the east end of the city, the suburban localities stretching thence along the shore. Here are most of those splendid mansions of which glimpses are caught from the harbour, which they overlook; while to the south lies the important quarters of Woolloomooloo, which has become almost as large as Sydney, and much more fashionable. Beyond this we reach Elizabeth Bay and Rose Bay, Double Bay and Rushcutter's Bay, where cluster various villa residences of the wealthy families. Look where one will from the city to Darling Point, and even farther along the coast, one sees more fine houses, many of which have been erected at great cost, and which for extent, tastefulness of internal decoration, and beauty of their grounds and gardens, are perhaps unequalled by any private residences on this side of the Equator. Of churches, &c. I believe there are upwards of one hundred and twenty in the city and suburbs, all more or less of imposing architectural pretensions.

The cathedral church of St. Andrew, in George Street, is a Gothic building, occupying a fine site in the most elevated part of the district, but it is comparatively small in dimensions, being 160 feet long by 62 feet in breadth. The Roman Catholic community are building a large Gothic cathedral on the site of one that was burnt down a few years ago.

The Public Gardens, where I spent many pleasant hours, deserve more than a passing mention. They are singularly aided by nature and also by clever management, which alone would be sufficient; but the whole effect is much heightened by the beautiful views afforded over cliffs, from beneath branching palms, and out of long avenues of stately trees, of the bright blue sea glistening in the sun. Beyond this rises the rocky tree-covered north shore, with villas peeping out here and there, in strong contrast to the dark hulls of the *Pearl*, *Challenger*, *Dido*, and other vessels snugly moored in Farm Cove. Passing through the Gardens, we emerge into the Domain, a noble expanse of park-land of 138 acres, of which Sydney has indeed cause to be proud. Every variety requisite to produce picturesque views is here obtained. The landscape effect, through the disposition of the groups and avenues of trees, makes it a most charming promenade. Near the main entrance as we leave is an excellent bronze statue of Sir Richard Bourke, erected a few years ago. Facing this is the Public Library. We are again in

Macquarrie Street, through which we pass, and continuing our walk a short distance farther, we reach the entrance to Hyde Park, where is a bronze statue erected in memory of the late Prince Consort. This park is a beautiful plateau of 40 acres, and, as it is nearly in the centre of the city, is a favourite resort of the citizens. It has a fine avenue half a mile long, and is nearly surrounded by plantations and clumps of trees, affording a grateful and pleasant shade. On the south-eastern side a monument to Captain Cook is being erected in a position which commands a splendid view down the harbour.

More recently formed reserves are Prince Alfred Park, in which stands the Exhibition Building, erected in 1870 for the Inter-colonial Exhibition held that year, which was the centenary anniversary of the discovery of the eastern coast of Australia by Captain Cook: so it was a festal time for the colony; and the result of the exposition of Australian industry was a thorough success. Every year the Agricultural Society hold their exhibitions here; and in this building the society gave their annual ball, at which many of the "Challengers" had the pleasure of attending, as also those given by the officers of H.M.S. *Pearl* and the Hon. John Campbell.

Belmore Park and a tract of 500 acres of land on the south-east side, named Moore Park, are the more recently formed reserves.

I must not omit to mention the Masonic Hall, as it was here the *Challenger's* ball was given, proving a thorough success, and giving the greatest satisfaction to our large company.

As to the people—English in every little action and idea, loyal to a man, with just a suspicion of the Spanish failing expressed by "*á mau bafia*"—they are civil and obliging in everyday intercourse, but possess a spirit of independence withal, and are certainly most courteous and hospitable in their homes.

How we visited the Blue Mountains, and by the zigzag railway reached the plains on the other side, with the German officers of the *Arcona*, as friends of the ministers—I was a guest at balls, dances, and picnics, attended a scientific *conversazione* of the Royal Society, and enjoyed the friendships and shared the pleasures of numbers of kind friends—all this I have already chronicled.

The stay at Sydney was long enough to lead to intimacy and such a pleasant reciprocity of regard that there will always be a certain amount of satisfaction and gratification in looking back on the days spent there.

All hands were very sorry when it was decided to leave. However, it was inevitable if the Expedition was ever to get round the world. So, after the return of the Professor and his staff from a trip to

Queensland, laden with botanical wonders and fishing spoils (amongst which were several specimens of a peculiar fish called "*Ceratodus*," or, popularly, "*Barramundi*"), a day was named for sailing. I may mention that this said *Ceratodus* is allied to the missing link. Found in a fossil state in Australia, it still occupies a place in the fauna of Queensland. In appearance it resembles a salmon, with large scales, a more webbed tail, and with fins which serve more directly for locomotion.

Before, however, leaving Sydney, it was decided to give a dredging picnic. The plan was to have a number of friends on board, and take them out into deep water, so as to let them see some of the mysteries of dredging and sounding.

The day decided on arrived, and a large party, chiefly consisting of gentlemen more or less interested in scientific pursuits and maritime affairs, availed themselves of the opportunity of having a cruise. On passing through the Heads, and getting into deep water away from the land, we steered for a short distance east, and then for a while E.S.E. The ship's head was then turned in a northerly direction, towards Broken Bay, and when about 4 miles distant, soundings were taken in 40 fathoms, and specimens of water brought up from various depths. The dredge was lowered, and on being drawn up, little or nothing appeared to have been secured; but small as the first haul was, it encouraged other attempts being made, and a move was made farther from the land, when several hauls of dredge and trawl were again taken, with satisfactory results.

Many of the specimens of marine zoology were vastly interesting, and in some cases quite new.

On each occasion as the trawl appeared above the surface of the water, the interest of our visitors was very great; the silent eagerness of the experienced naturalist and the feverish exultation of the amateur conchologist, as they pounced upon the newly discovered specimens, formed quite a lively scene, and the opinions of those learned in such matters were often very amusingly expressed.

After mid-day we steamed in towards Long Bay, where a dredge was lost through getting entangled amongst the rocks, and another shared the same fate soon after between Coogee Bay and Bondi, the ground here being very unsuitable for our operations; still, other trials were made, and altogether the results were considered very satisfactory. On its conclusion we returned to the anchorage, and took in moorings off Fort Dennison, at the entrance to the Circular Quay, all our visitors, before leaving, expressing themselves as having spent a most delightful and pleasant day.

A farewell party was afterwards given to our lady friends, after

which there was dancing and other pleasures suitable to the occasion in the society of those whom it had been our good fortune during the past two months to meet frequently at similar entertainments on shore.

It passed off well, and gave great satisfaction to all concerned, every one regretting that we were so soon to part.

June 7.—We leave to-morrow, and I feel assured no one can visit here without being at once struck with the singular beauty of the harbour and the surrounding scenery; and I shall not easily forget the feeling of regret with which my mind dwelt on the thought that I was bidding Sydney a long, long farewell.

It was a lovely evening; not a single breath disturbed the glassy surface of the silent water; and yet how eloquently that silence spoke to the heart! And as I leant over the vessel's side, filled with all those nameless feelings which such an hour is often wont to call forth, I felt, notwithstanding all the temptations of promised adventure, the full bitterness of the price we have to pay for its excitements.

That we had been great favourites, and had made many friends during our stay, was very evident, and there can be no doubt that the *Challenger's* visit will long remain in the recollection of our Australian friends.

It is worth remarking that the traveller, on reaching these shores, should remember it was here at Sydney where our Australian empire was commenced, amidst dangers and difficulties of which those in England at the present time think very little.

Captain Cook landed in Botany Bay, which is a few miles south of Sydney harbour, in 1770, and took possession of the land on behalf of the British crown.* But Captain Cook was by no means the first to find Australia, for some hundred of years before this a Portuguese navigator is said to have landed; and about the same time a Spanish expedition sent from Peru visited the northern coast, one of the commanders of which gave his name to Torres Straits. After this the Dutch appear to have seen a great deal not only of the coast, but the various islands, which were then named Terra Australis. Indeed, they did so much, and were so energetic in their voyages, that they were quite justified in calling the continent New Holland.

It seems now to us very strange that a people so enterprising, and at that time so prone to get and to keep territory, should have lost their hold on this great Terra Australis.

* Trollope's 'Australia and New Zealand.'

It appears that they defeated their own object by their own secrecy and selfishness. They published no records of their voyages, neither made any charts of the newly discovered continent, fearing that their discoveries, or these great possessions, should become too well known to other explorers. Consequently, even amongst themselves the doings of their sailors were unknown and unappreciated, and no national desire was created for the possession of the land.

A Frenchman, it appears, was the next who anchored off Cape Leewin—the south-eastern corner of the continent; this was in 1640. After this some forty years elapsed, when William Dampier landed on the western coast, and was, as far as we know, the first Englishman to set foot on the soil of our great dependency. For nearly a century now, it seems, English, French, and Dutch, with intermittent energies, endeavoured to become masters of New Holland. It was not until some seventeen years after Cook had really taken possession (in 1787) that Commodore Phillip, the first Australian governor, was despatched from England with a view of forming a penal settlement at Botany Bay; but soon after his arrival he found that locality altogether unfitted for the purpose. Then he sailed northward, entered Port Jackson (as he first called it), and created the colony of New South Wales, from whence have sprung all our Australian colonies.

This (June 8) might be said to have brought our visit to a close. Unfortunately, it was a rough and boisterous morning; so the plan that had been in contemplation by some of our friends to accompany the vessel outside the Heads was frustrated. Instead, however, of their presence on board, the white signals of waving handkerchiefs from the shore showed that they were near at hand, and with all their good wishes, about 11 A.M., we steamed out from the anchorage, receiving quite an ovation on passing the *Pearl* and *Dido*, the ships' companies manning the rigging and cheering heartily, while the bands played appropriate and inspiring airs.

The weather had moderated as we reached the mid-channel, passing round Fort Dennison, Bradley, and through the Heads.

On clearing the harbour we found a rough and troubled sea; so in sight of the land we rolled about most unpleasantly all night.

June 9.—A gale of wind, with heavy and rolling seas, prevented any sounding or dredging being undertaken, and as the day advanced, it was found necessary to seek shelter within the Heads.

A continuance of rain and high southerly winds kept the *Challenger* at anchor until the 12th, when a second attempt was made, under more favourable conditions of weather, to run a line of soundings to New Zealand, a distance of about 1100 miles. The

day was spent in sounding out to deep water, to afford a guide as to the approximate amount of long-shore cable necessary. The results showed a gradual slope, commencing at 85 fathoms up to 950 fathoms at 40 miles distant. The next day's soundings indicated 1200 fathoms, with a bottom of sand and mud. Course was now altered nearer the shore until in a depth of 400 fathoms, when dredging operations commenced; and here was brought up a large sea-urchin, 11 inches in diameter, quite new to science, fitted with cups on the spines of the under surface, serving for the purpose of locomotion. The spines of this animal had been found in the north, and were stated by Dr. Carpenter to be portions of a sponge; the scientific name of this species is *Phormosoma*. There were many serial temperatures taken, which showed a current of warm water running south.

A heavy gale now sprang up, and we got into deeper water, and the attempt to find bottom resulted in losing 2000 fathoms of line and two thermometers. During the night the sea was very luminous, and a good deal of lightning was noticed; the wind freshening considerably from the south-west, the ship lay to under treble-reefed topsails. The following day the weather had moderated sufficiently, and soundings were again resumed, showing a depth of 2550 fathoms, Cape Farewell being distant 936 miles.

June 17.—Soundings showed 2600 fathoms; a few hours were spent in dredging, but with trifling results.

From this date the soundings became less—from 1975 to 1100 fathoms, and then unexpectedly we came into 400, 300, and at last 275 fathoms, when we trawled successfully, getting, amongst other things, a large number of white shrimps.

The rocky nature of the bottom at this position (200 miles from land) was considered very remarkable. This afterwards was proved to be the western edge of a shallow bank extending from the coast.

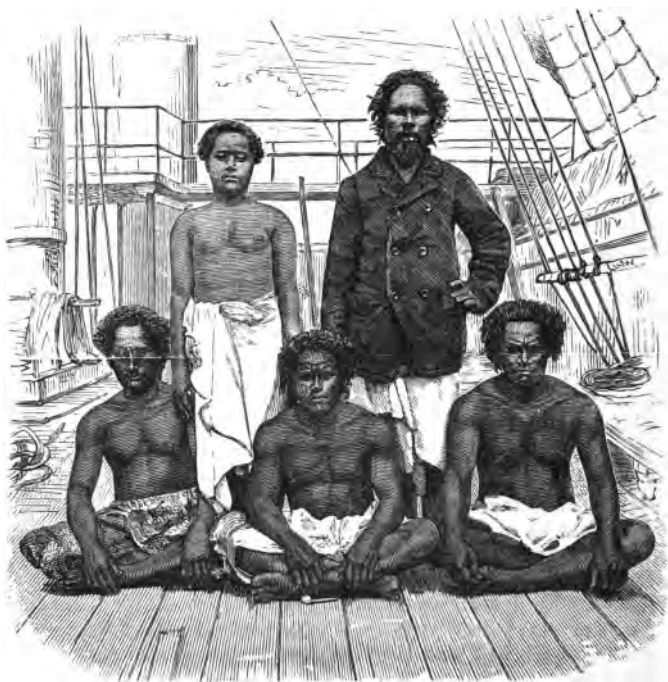
Placed in the very track of storms, and open to the sweep of seas from every quarter, exposed to waves that run from Pole to Pole, the shores of New Zealand are famed for surf and swell; and so we had found them up to the time that Cape Farewell was sighted, when the wind again freshened considerably and increased in force, blowing violently from the south-east, with a very heavy sea. It was therefore decided to take shelter in Port Hardy (an inlet in the north of D'Urville Island), and none too soon; only just in time, in fact, to escape the fury of the gale, which lasted all the next day, compelling us to remain until it had moderated, when another attempt was made. But the fates were against us, and after battling

on for 20 miles shelter was sought under Long Island, in Queen Charlotte Sound.

At daylight next morning, in spite of the weather, we made a successful run across Cook's Straits, and fortunately a strong current in our favour enabled progress to be made under steam and sail, the ship pitching, straining, and shaking in a most unusual manner. The sky being bright and clear enabled us to get a capital view of the mountain ranges of the middle island; Ben Mor, 4360 feet, and the Karakora ranges, 9700 feet, were clearly visible, with their peaks covered with glistening snow.

When about 10 miles from the anchorage, we were visited with an unlooked-for calamity. One of the seamen, named Winton, who was stationed in the fore-chains heaving the lead, was washed overboard by the heavy sea. He was not missed for a few minutes, for none saw the accident. When it was discovered, however, the ship was immediately put about, and a hundred eager eyes searched for some signs of their shipmate. Nothing could be seen, and after waiting an hour all hopes of the poor fellow being above water were given up: he must have gone down at once in the turbulent sea running. As we neared the port, we were glad to escape the long rolling seas that seem to surge up from the Antarctic. Such unfavourable weather prevented much use of the dredge. But the few hauls that were obtained, although producing many interesting and rare specimens, indicated that the bottom in this locality is, for some reason, more scantily supplied with animal life than many other more favoured regions.

Just before sunset the entrance to the great indent at the top of which Wellington is situated was made out. A rough reef of black rocks awash, with the ribs and timbers of a recent wreck, showed the inhospitable nature of the shore, if indeed such an addition was necessary to establish our dangerous proximity to a rocky coast with a rolling, roaring surf. This was an introduction to the wild and grand scenery of New Zealand. Our troubles were over for a while, for within a few hours we were in smooth water, running up the great sea-lake of Port Nicholson, towards a long line of vessels lying at the Queen's Wharf, behind which stretched away the houses, &c. comprising the city of Wellington. Off here we came to anchor.



NATIVES OF TONGATABU, FRIENDLY ISLANDS.

CHAPTER IX.

WELLINGTON (NEW ZEALAND) TO FRIENDLY AND FIJI ISLANDS, TO THE NEW HEBRIDES GROUP, AND TO SOMERSET, CAPE YORK (QUEENSLAND, AUSTRALIA).

At Wellington—Results of the soundings—Formation of the bottom—Description of the city—Australia and New Zealand—Hospitality offered by Christchurch, Otago, and Auckland—The Maoris—Early history of colonisation—Leave Wellington—Squally weather—The colonies no place to send scapegraces to—Trawling off the coast—Sight the Kermadec Islands—Sounding and trawling—The Friendly Islands—Eoa—Tongatabu—Anchor off Nukalofa—Tonga—The village: its natives—Tapa: its manufacture—Captain Croker's attack on Bea, and the result—Foliage and scenery—Leave Tongatabu—Passage to Fiji—Off Matuki—Land on the island—The sport—Dredge off the coast—A living nautilus—Anchor in Ngola Bay, Kandavu—Sport on shore—Kandavu to Levuka—Anchor off Levuka—The settlement—Its early

history—Return to Kandavu—Natives of the New Hebrides on board for passage to Api—Survey Ngola Bay—Thescenery—Tattooing—Mek-ki Mek-ki—Leave Fiji—Cruise of the barge up the river Rewa—Visit to the king—Kava—Native college—Sugar plantation—Missionary offerings—Native dance—Missionary teachings—Fiji to New Hebrides—Off Api—The natives land—The landing, and what was seen—Sounding and dredging—On our way again—In the Coral Sea—Off the Louisiade Archipelago—Raine Island—The Barrier Reefs—Anchor off Bird Island—Arrive at Somerset, Cape York, Queensland.

THE special object of our visit was to ascertain the oceanic section between Sydney and Wellington. The information obtained removes the last elements of uncertainty in the matter of submarine telegraphy between Australia and New Zealand, a subject on which the governments of the respective colonies have been negotiating for some time past. The soundings show that the depths increase gradually after leaving Sydney, but that the extreme deepness does not vary much for some hundreds of miles in mid-ocean, the water again decreasing as the coast of New Zealand is approached. For the greater part of the way across, the bottom was found to be very favourable for the repose of a light cable, being composed of mud and sand. It is only when the shores of this coast are nearly reached that the bottom becomes of a somewhat doubtful character; a stronger cable will therefore be required for the shore end. In all probability, now that these correct data have been ascertained, we shall find very shortly that New Zealand, like the Australian colonies, will be in instantaneous communication with Europe and America.

Wellington, which since 1864 has been the capital of New Zealand, the residence of the governor (Sir James Ferguson), and seat of the legislative assembly, is but a small straggling city containing between 8000 and 9000 inhabitants. It is built almost exclusively of wood, the use of which has been found necessary, from the frequency of earthquakes. The position it occupies—lying high up in a bay—gives it a somewhat pretty appearance, surrounded as it is by mountainous land. To us, just coming from Sydney with all its gaieties, Wellington seemed a poor, dull place, especially at this season of the year. Possibly it brightens up a little when the legislative assembly is sitting. Auckland was the capital from 1840 to the date when this was chosen, which was not on account of its commercial prosperity, but because it was more centrally situated for political purposes. Had the weather been fine during our stay, there were several interesting spots round Wellington that might have been visited; for within two or three miles are the remains of an old forest; while up the valley of the Hutt a Maori

village is still standing, to which a line of railway runs; and the Horokiwi valley, a beautiful glen 40 miles out of town, is well worth seeing. Near at hand are the Botanical Gardens, neatly laid out, and possessing great advantages in the position of the land and the shapes of the surrounding hills.

Perhaps no two countries in the world, within such a short distance of each other, are so wholly distinct as Australia and New Zealand. Here the natives are Polynesian, similar to most of those found in the South Sea Islands, while Australia's aborigines are of the negro type. The scenery and climate also are equally distinct. New Zealand is of volcanic origin: hence high mountainous cliffs surround it on almost every side; a chain of mountains runs through the length of both islands from north to south; hot springs abound, often close to glaciers and eternal snows; earthquakes are common, and active volcanoes are not unknown. The climate is damp and stormy, and the land is covered with tangled masses of jungle and tree-fern. In addition to all this, even the very fossils are dissimilar, as are the fauna and flora.

In this proverbially wet port we remained for ten days, leaving somewhat suddenly on the afternoon of the 6th July, although it was raining furiously and blowing a gale from the north-west at the time. However, we had hardly cleared the heads of Port Nicholson when the weather became so thick that the marks to clear the reefs could not be distinguished; so the ship was anchored for the night in a lively-looking spot, appropriately called Worser Bay.

At daylight next morning the weather had moderated sufficiently to make another attempt. After clearing Cook's Straits, sail was made, and we coasted along the land about 10 miles distant from the shore, and did some dredging and trawling.

And so we bade farewell to New Zealand; the anticipation of spending a pleasant month there having proved false. The people of Nelson and Christchurch invited the ship; then those of Otago sent a pressing invitation, with free quarters for all who would land; Auckland wanted to make much of the scientists, as they always do of naval men; an escort of native troops and a splendid guide, in the person of Mr. Gilbert Mair, were placed at our disposal for a trip from Tauranga to the celebrated hot lakes—all these pleasures we lost; and we felt our loss very much.

Of the Maori people, I saw very few: only one man, much tattooed, and in native dress. Several, however, were to be seen in European dress, of both sexes. All seemed fine, well-built specimens of mankind. How superior to the ordinary negro these people have come out of all their troubles, and how differently they have

compelled us to treat them from the rest of the natives of our colonies. My readers will probably be more interested with the New Zealand of the present than that of the past. I may therefore pass by its earlier history from the year of Cook's first visit in 1769. Tasman, the Dutch navigator, was the first who made known the existence of these islands to the civilised world; but he coasted along part of the northern shores without attempting to land. In 1839 a company was formed who took matters into their own hands, and regularly organised the colony of New Zealand on what is known as the Wakefield plan, a scheme which three years previously had been applied to the settlement of the colony of South Australia. The main principle of this system may be broadly described to be the importation of labourers at the expense of a fund supplied by the sale of the land at such a price as to prohibit the imported emigrant from himself becoming a landowner till by his labour he might be supposed to have compensated the capitalist or the state for the cost of his importation.

The first three of the colony's settlements—Wellington, New Plymouth, and Nelson—passed through somewhat of a stormy youth; but Otago and Canterbury, the two foremost of all the provinces, founded at a later date and in smoother times, have been perhaps exceptionally fortunate from the first; a success which may be attributed to the principles of their foundation, but with which the discovery of gold and of vast pastoral resources has had possibly as much to do as has the system of Colonel Wakefield.

In 1840 a treaty was signed by over 500 of the chiefs, by which the sovereignty of the islands was ceded to England, and from this date Maori and Englishman have sat side by side in the upper and lower houses of parliament, a sight never before seen in history. But between this date and 1874, wars and insurrections raged fiercely over the land; and how much "*vieux bon sang d'Angleterre*," to slightly alter the old Burgundy knight's expression, has been spilt! And to-day there is still a territory tabooed to the white man, the chiefs of which, true to their traditions, deny all allegiance, and yet live in peace.

The history of New Zealand is a wonderful story, a romance, indeed, full of the greatest interest.

A few days out from Wellington a gale drove us fast to the northward, and so prevented our visiting Auckland and completing the section which had been so much desired, as the similarity of the flora of New Zealand to that of its neighbouring lands indicates that they were at one time joined, and that New Zealand was part of a large continent embracing the islands to the south and east of

it, and also the Kermadec group, together with Norfolk and Lord Howe's Islands, near the Australian shore. Had the weather been more favourable, a few soundings would have helped to settle this interesting question.

New Zealand, with her magnificent variety of scenery, blessed with a climate (for our experience of Wellington in the winter must not be regarded as a specimen of all the settlements) which happily avoids either extremity of heat or cold, rich in all things which grow above, and in most things which are found beneath the earth, is a kindly land to those who can and will work; a land of plenty to those who can employ others to work for them. Two days here, as in Australia, are sufficient to disabuse one of the ruinous idea so prevalent at home, that to the colonies is the fit place to ship off the lame ducks, the ne'er-do-wells of the family. Such had better stay at home: they will find no sympathy for their failings and weaknesses here, in a land of strangers, who, though hospitable perhaps above all other classes of men, are from their own experience so much impressed with the hard realities of life as to have little but scorn to spare for those who are afraid to face them. The end of a young fellow sent out to cure him of bad habits can be told ere the ship leaves Gravesend. At this moment, cleaning the instruments and doing the dirty work in the chart-room on board, is an Oxford graduate, of five or six and twenty, entitled to a competency for life if he can only keep clear from drink for two years. After being in the bush as a stockman, loafing about the streets and quays, he is trying the cure of man-of-war discipline, and we have hopes for him. And this man's history is one of many similar. So I say no greater mistake ever was or could be made, in the first instance, by the man himself, in the second, for those among whom he went. These new countries are not suitable places in which to repent of evil habits. At least, if the man may no longer stay at home, let him not come here; or his last state will assuredly be worse than his first.

July 8.—Coasting up the east side of New Zealand, in sight of land, with fine weather. After sounding in 1100 fathoms, with a bottom temperature of 35.5° , the trawl was successfully used, and some new additions made to the naturalist's collection. Steaming along the land; passing at night through patches of phosphorescent light caused by numerous pyrosoma. The largest picked up was 11 inches long and 4 inches in width. The effect was very pretty as we steamed through these belts of pale green light on the surface of the water. The next day the trawling from 700 fathoms was more than good; several large fish, macrourus, and a variety of

crinoids being caught. Crossed 180° of longitude, and so got behind in time with England.

On the 13th passed within a short distance of a dangerous reef indicated on the charts as Esperanza Rock, and at daylight the following morning Raoul or Sunday Island, one of the Kermadec group, was in sight. Admiral d'Entrecasteaux, with the vessels of a French surveying expedition, first made known the existence of these islands to the civilised world in 1793. They consist of a cluster of dangerous rocky islets, which are rather to be avoided than approached, owing to their hidden reefs. The largest of them, Sunday Island, is only some 12 miles in circumference. Its highest point, rising to a height of 1627 feet above the level of the sea, presents a rugged and steep appearance. Until recently an American family was living here, earning a very precarious livelihood by supplying vessels calling with poultry and vegetables; but the frequency of earthquakes, storms, and a sudden eruption of the volcano forced them to abandon it. The other islands, named Curtis and Macaulay, are not more than 800 feet above sea-level, and only from 1 to 3 miles in extent.

It was decided not to land, but the day was given up to trawling from a depth of 600 fathoms, the rich ground yielding some very fine sponges about 2 feet square, tinged a pretty crimson; several pentacrinus, asterias, seapens, echini, some new fish, the largest macrourus yet caught, pieces of red coral, crustaceans of the finest red colour, and a lot of pretty small shells; in fact, a day to be marked with a white stone. The next was again successful, and from a depth of 660 fathoms the number of crinoids and fish caught was very great.

July 17.—Latitude $25^{\circ} 5'$ south, longitude $172^{\circ} 56'$ west, with the nearest point of the Friendly Islands 248 miles distant, the unexpected depth of 2900 fathoms was obtained, with a bottom temperature of 32.4° ; this is the deepest water found since leaving the Atlantic. The bottom was composed of red clay, without a trace of the carbonate of lime which is usually found in deep water.

The weather had been squally for the past few days, but on the morning of the 19th it cleared, and at daylight land was reported. Proceeding on, we were soon almost surrounded with islands and small rocks, many only giving indications of their position by the surf breaking over them. After passing through Astrolabe Channel, the ship anchored in 14 fathoms at a short distance off the town of Nukalofa, the capital of Tongatabu, nearly abreast of the king's palace, a neat little bungalow embosomed amongst the trees.

In the harbour were three American whaling barques, a German

schooner, and two vessels flying the national flag of the country (a red ensign with a St. George's cross on a white ground in the canton). A similar flag was also flying in front of the government buildings.

We were soon surrounded with canoes and natives, who were indeed fine fellows, of a light brown complexion. These people have been described as the flower of the Polynesian race, and those alongside seemed worthy of the title.

Only a short stay was made at this interesting group of the Western Pacific, as it was necessary to get on our way, so as to meet the favourable monsoons in the Chinese Seas. But, short as it was, every opportunity was taken of seeing the surrounding country.

The town of Nukalofa, off which we anchored, is prettily situated in a bread-fruit and cocoa-nut grove, which gives it a pleasing, shady appearance, and yet is sufficiently open to admit the cool, refreshing breezes of the trade-wind. Facing the sea are the government offices, the residence of the king, the governor, &c., while the native houses are prettily situated in a valley at the back. The houses are lightly constructed of bamboo and palm leaves, and are for the most part surrounded with small inclosures, shut in by fences made of cocoa-nut fibre and leaves, shaded by bread-fruit and other varieties of tropical trees of luxuriant foliage.

We had frequent opportunities of seeing the king, who, since embracing Christianity, has taken the name of George Tabu; he and his queen, Charlotte, expressed a wish during our stay to have their portraits taken. This was attended to, and for the occasion their Majesties were got up in regal attire: George I. in naval uniform coat, with four gold-lace stripes, surmounted with a crown, and lace trousers; while Queen Charlotte was attired in a light muslin costume of European make.

His Majesty is a tall, hale old gentleman, at least eighty years of age, who doubtless during his early days saw much fighting, and was probably mixed up with most stirring affairs in his native land; for, in a conversation with his secretary, or prime minister (who is an American gentleman), we were informed that during his younger days he had the reputation of being a distinguished warrior. But since embracing Christianity, he has continued to devote himself to the business of state and the improvement of his subjects.

The Tongans have by some travellers been styled the Anglo-Saxons of the South Seas. They are a fine race, tall, robust, and of a lighter complexion than the inhabitants of the adjacent isles; they have little or no beard; their noses are somewhat flat with wide nostrils, yet many of the men and women might pass for handsome types. The women follow the fashion of the men, cutting

their hair very short, and staining it with chinam, which gives it a reddish tinge.

The dress of both sexes is made of similar material, but is differently arranged. The fabric (*tapa*) is made from the bark of a tree extensively cultivated throughout the islands, and is beaten out with a wooden mallet about 1 foot long and 2 or 3 inches thick. The bark is at first soaked for a couple of days in water, and is usually so prepared in strips of from 2 to 3 feet in length, and from 1 to 3 inches in width; it is then laid on a beam about 10 feet long, and about 1 foot in breadth and thickness supported at each end, a few inches from the ground, on a couple of stones, so as to allow a certain amount of vibration. Two or three women generally sit at the same work: each places her strip of bark transversely on the beam, and, while beating with her right hand, with her left she moves it to and fro, so that every part becomes alike. The grooved sides of the mallet are used first, the finishing touches being given with the smooth side. In the course of half an hour it is brought to a sufficient degree of thinness. Piece after piece is thus made, and eventually stuck together. Many I saw were from 40 to 50 yards long by 20 yards wide. It is then printed on with a dye obtained by scraping the soft bark of the cocoa-tree, or the tooi-too-tree, which gives, on being pressed, a reddish-brown liquid. The stamps used are made in various devices for ornamenting the native cloth. While they are at work, a very pleasing effect is produced, when the air is calm, by the beating of the *tapa*: some sound near at hand, others in the distance, but all with singular regularity, the whole producing a remarkable and agreeable sound.

The wearing of this native cloth, and, consequently, the manufacture of it, are ordered to be discontinued in three years' time after which period calico is to be worn. This mandate has been given in the hope of developing the cultivation of cotton, and by so doing enriching the islands; but probably it will be difficult to induce the natives to give up their old usages and customs.

Before leaving, I had an opportunity of visiting the native church, which is prettily situated on the top of the highest hill. It is a neat-looking building, consisting of a nave and two aisles: the frame-work of the roof is cocoa-nut tree, supported on columns of hard wood, and thatched with palm leaves. About a dozen windows on each side light the building. Benches are provided to seat about eight hundred. There is a fine pulpit, and a good-sized organ, which was well played by one of the natives. The sermon was preached by a Tongan, and the singing was very good.

Public schools are giving most satisfactory results, and a large proportion of the rising generation can both read and write.

Near the church door is a monumental stone, which has recently been erected to the memory of Captain Croker, R.N., of H.M.S. *Favourite*, who was killed by the natives in an attack on Bea, in June 1840. Its history, as told in the school-books here, is that "the natives of Bea continuing their heathen practices, and resisting all the efforts of the missionaries to change their evil ways, the king, who was a zealous convert about this time, sought the assistance of the captain of an English man-of-war then in port to chastise these idolaters, and so help convert them by the aid of the sword." Captain Croker landed; taking two field-pieces with him and a number of blue-jackets and marines. The village is about five miles from the anchorage, and it seems that on their arrival they found that the natives had fortified it with an earth embankment. The assault was led by Captain Croker, it is said, with sword in one hand and Bible in the other. However, very early in the engagement, he received a mortal wound from an arrow, several of his followers were killed or wounded, and the cannon captured; the English retreating, without at all assisting the mission. The old king remembers all this, and has caused the monument to be erected.

These islands are all of coral formation, and surrounded with extensive reefs extending away to the northward. The luxuriance of the foliage is not surpassed anywhere within the Tropics. Although but little attention seems to be given to cultivation, yams, sweet potato, banana, cocoa-nut, bread-fruit, sugar-cane, shaddock, and limes are produced plentifully, and find a ready sale on board whale-ships and other vessels visiting the port.

On the 22nd July we got under weigh, and, passing without the reefs, stood away to the westward. It was blowing somewhat squally, and in the darkness of the night it was by no means pleasant running over unknown and uncertain ground.

At daylight on the 24th we found ourselves in the midst of a number of beautiful islands all girt with white circling reefs. Each island had its own peculiar beauty, covered as it was with luxuriant vegetation. About mid-day we stopped off Matuki, which is one of the southernmost of the Fiji group. It was discovered by D'Urville in 1827, at which time the number of inhabitants was estimated at 1000. Captain Denham, whilst in H.M.S. *Herald*, spent some months surveying the place in 1852, and spoke well of the 500 Christian natives he met with here.

The island is high, probably as much as 1200 feet, and sur-

rounded by a coral reef with a passage about a quarter of a mile wide at the north-west side. Off this the ship hove-to, and a goodly number of us landed to explore. Two natives only were met with on the beach, where the boat touched, and one of them showed us the way by a dirty footpath near the edge of the water to the village of Aaron, not far distant. The place was a miserable collection of houses, the ground showing no signs of cultivation or irrigation. The old chief was seated in a stifling atmosphere, awaiting us inside the hut for strangers. The place was surrounded with fifty or sixty men, but not a woman was to be seen. Following a dirty road over the spur of the hills, the village of Lomati was reached; it was larger and much cleaner than Aaron. The native missionary was absent, and we learned that the island contained no white inhabitants. Here the women made their appearance, and approached us, timidly at first, but after a short time their fears disappeared. They were a different type from the Tongans, and have little that is pleasing in dress, manners, or appearance.

From Lomati, after a walk of about two hours, Ribba Ribba was reached, a fishing village with about 60 or 70 inhabitants. Every one appeared to be miserably poor. Here a ship's boat picked up our party, and we returned to the first landing-place, from whence all hands went on board. Some beautiful plumed parrots, a heron, and many smaller birds had been shot: a specimen of the fish found amongst mangroves which lives either ashore or afloat was procured here climbing amongst the bushes. While the party was away, the vessel cruised backwards and forwards dredging, and some excellent hauls were made. Among other things a fine nautilus was brought to the surface, and the opportunity was thus given of seeing this beautiful creature alive in its native element. The old popular idea, that this animal lived on the surface, and floated along, using its shell as a boat while it was being propelled with its own sails and oars, has to be given up, for it is now found that the creature lives at or near the bottom, using its shell, with the curved side uppermost, as a protection, and that it never comes to the surface except after death.

As the evening advanced, the ship proceeded under sail. A run of 70 miles during the night brought us this morning (25th July) in sight of the island of Kandavu, one of the southernmost islands of the Fiji group. It is a high, prominent island, and looks pretty from the sea, surrounded with an encircling coral reef, over which the surf breaks furiously; thus forming a capital danger mark for approaching vessels. Under sail we passed through the channel,

and not long afterwards anchored in Ngola Bay. We expected to find a town with piers and lighters, and the usual consular ensigns flying, but nothing but a few huts on the mainland of the island, and an iron store belonging to the mail company on Ngola Island, could be seen.

The natives came swarming off in their canoes, bringing a few "curios" in the way of clubs and spears, but evidently made up for sale. It seems the passengers by the mail-steamers calling here patronise these dealers to a great extent, buying up all and everything Fijian at all sorts of fancy prices. Good sport was obtained during our stay here, and some splendid specimens of pigeons, parrots, and small birds, all in brilliant plumage, were shot. One pigeon peculiar to Fiji is noted as interesting, differing much from all other pigeons in feather and colour, and very scarce in European collections. It is green and yellow, with a blue mark on its head, and grey belly feathers. A parrot amongst the collection was also peculiar to these islands (a specimen alive has recently reached England for the Zoological Gardens). Dredging in the bay was not productive of much that was new. The shells procured were common, a water-snake rare, and Hearder's trawl brought up five or six species of edible fish, besides several peculiar ones. Thus a couple of days were spent. On the 27th the ship weighed and proceeded along the land amidst lovely scenery, numbers of islands being scattered about, each possessing some peculiar attraction. But the eye, as well as the mind, felt greater satisfaction as we approached the island of Ovalau, which, on nearing, had more the appearances of civilisation about it than the others. It is also the highest, most broken, and most picturesque. On the 30th we were off the harbour, which is surrounded with detached coral reefs, over which the surf was breaking in white foam. Entering through an opening only 800 or 900 feet wide, we reached the anchorage, the shallow, clear, and still waters of which afforded as great a contrast as possible to the dark turbulent waves outside. Several coasting vessels were here at anchor, and amongst them the little schooner, *H.M.S. Renard*.

Levuka is the commercial capital or chief town of Fiji. The settlement is much larger than one would at first imagine. A row of shops, hotels, and liquor stores occupies a position fronting the beach; the better class of houses and residences are situated on the hillside. The streets and vicinities of the liquor stores are occupied all day long by slouching whites, seedy in dress and manner, without any visible signs of occupation, while still lazier natives stroll along the roads and streets, dirty, treacherous, and

discontented-looking. The first European settlers (except a stray seaman left behind from a ship occasionally) were some escaped convicts from Sydney. However, after a time the number of whites increased, and land was purchased in all sorts of manners from the natives. To-day the white population is estimated at between 2000 and 3000.

The first missionaries (Wesleyans) landed in 1835, and they have now a thousand chapels and preaching-places in these islands. The ceremony of the payment by the natives of their yearly contributions to the missionaries was witnessed by some of the officers at Mbau, which I shall refer to further on. In 1860, Thakombau, acting probably under the advice of the missionaries, although the other chiefs denied him the title of Tui-Viti, or King of Fiji, offered the sovereignty of the islands to Great Britain, but it was declined by the British government. After a while the Fiji and Polynesian Land Society followed, as a matter of course (how like the history of New Zealand), with a wondrous prospectus and very little cash. At last, tired of troubles, and far-seeing enough to distinguish pecuniary personal benefit, Thakombau, gaining over some of the principal chiefs, succeeded in getting Lieutenant Woods, a surveyor of the New Zealand government service, to form a government for himself and the white population. In August 1871 delegates drew up a constitution for the kingdom of Fiji, and the first Fijian parliament assembled. The government was executive, and ministry legislative. Privy council and house of representative, judicial and supreme courts, with chief justice and two associate judges (one a native), were constituted. The privy council was formed of the native governors of provinces. The house of representatives was limited to 40 members, the franchise to manhood, payment of taxes, and six months' residence. His Majesty King Thakombau was granted £1500 a year, and £200 for his privy purse, and the members of the ministry were all well cared for. A subsidy of £3000 was voted to the mail company; a large loan was obtained from a German house, on the security of the land, without reference to the probable wishes of its hereditary owners. A mayor and corporation were soon seen at Levuka. Recalcitrant taxpayers and governors were persuaded to aid by a show of force, but still the anticipated revenue was not forthcoming, and several of the influential chiefs, finding they were shut out from most of the good things going, seceded; and a crisis was at hand. At this time some sea-island cotton from Fiji fetched a very high price in the English market, and a rush to plant cotton took place.

The price of land increased enormously, and there appeared a brighter future, but the next shipment of cotton was not so successful, and the want of labour prevented proper care being taken in its cultivation or quality.

A crisis soon occurred; the country was in danger, and the white settlers in despair of the future, when a renewal of the sovereignty of Fiji was made to England as the only possible alternative of getting out of their debts and difficulties. Mr. Layard, Commodore Goodenough, R.N., and a Mr. Sahl (I believe), were appointed commissioners to investigate the state of affairs, and report on the terms of the proposed annexation. The results are gone to England, and the settlers await with feverish anxiety the reply.* I fail to see myself what advantages will accrue to England by annexation, with the warning before us of the difficulties of the land question in New Zealand, the paucity of population, and the high price of labour in that and the adjacent colonies. In the face of all this, our government is asked to burden itself with a group of islands containing a half, nay, a wholly, savage population of 200,000 people, lazy, treacherous, discontented always, and without the necessity of working to earn their daily bread. Granted that the soil is very fertile, that the islands should be the sugar country of Australia, and that coffee, maize, and cotton are easily raised. One thing is certain—the Fijians themselves will never work to raise the crops. At the present time the West Indies are crying for Lascar labour, and there are other of our colonies ready to utilise all we can send them. Where are those to be found for Fiji? If the rôle of England is to civilise the Polynesian islands by paying their debts and enriching the pocket of the white settlers possessing, or stated to possess, enormous quantities of land, then annex all that are willing.

Our stay at Levuka was confined to four days, and these proved long enough to satiate us with the place. While here, the barge (one of the large boats) left on a detached cruise to Mbau, the river Rewa, and from thence to Kandavu. She took away a number of officers and one of the civil scientific staff. Leaving Levuka on the 1st August at daylight, on the 3rd the reef of Ngola Bay, Kandavu, was reached, and here we remained sufficiently long to make a survey of the anchorage.

Kandavu is the south-westernmost of the Fiji Islands, and except around its highest mountains cultivation or its traces can be seen in all directions. It is about 25 miles long, and throughout its whole length is high and precipitous. The island is well covered

* Since this was written, Fiji has become a British Colony.

with timber, resembling the New Zealand Kauri pine, and most of the large canoes used amongst the islands are built here.

The harbour is well protected by a reef, through which are several passages. Very little appears to be known of the coast; so an accurate survey is much needed, and on this we were partially engaged during our stay.

A walk in the interior was very enjoyable, although it required great exertion on account of the rough roads: the pedestrian having here, perhaps, to toil up an almost perpendicular rise of 15 to 20 feet, then to cross a narrow ridge, followed by a descent into a deep valley, all clothed with tangled vines and shrubs. Walking was occasionally all the more awkward from the number of roots and the slippery mud; again, rivulets were met with, from which water continually bubbled across our path, and hurried headlong down the ravine. The scene that presented itself was truly beautiful; the picturesque valleys of the adjacent islands lay in full view beneath, exhibiting here and there spots of cultivated ground, with groves of cocoa-nut and bread-fruit trees; while in all directions were native houses, perched on apparently inaccessible cliffs overlooking small domains, and the several peaks rising in sight all cut and broken in the most grotesque manner: in the distance the various islands in the group, and the fantastic needle-shaped peak of Vanua Levu were distinctly seen. The detached reefs could be traced for miles by the water breaking over them, until they were lost in the haze. I called on my way at many of the natives' houses, and was always received with marked hospitality. In one place the inmates had recently had their hair dressed for some coming festival; it had been washed in lime-water, so as to make it frizzed, and then dyed in various colours and arranged in different ways. Several days must have been spent in getting these extraordinary head-dresses into shape; and for fear of again disarranging them they are content to sleep on a pillow made of a length of bamboo, on two short cross-legs, so constructed that no European could rest his head upon it for five minutes without suffering dreadful pain.

It is all very well to talk about the ease of living in a state of nature, but the inconveniences to which savages put themselves in order to gratify their vanity are quite as great as, if not greater than, those forced upon us by the fashions and dictates of our society. Think of the agonies of tattooing. What would the natives give to escape them, if society would permit? But the stern laws of fashion, even here, allow of no exception. The practice seems to be confined to the women, the operation being performed by members of their own sex, and applied solely to the corners of the mouth, and

to those parts of the body covered by their scanty clothing. The process is generally tedious and painful. The skin is punctured with an instrument made of bone, or with the spines of the shaddock-tree; whilst the dye injected into the punctures is obtained chiefly from the candle-nut. No reason is given for the adoption of this custom beyond its being commanded by God. Neglect of this divine commandment is believed to be severely punished after death.

The walk back to the shore, although another route was chosen, was just as rough as the one taken in the morning. At times we had to climb nearly perpendicular rocks, to creep under low bowers formed of reeds and brushwood, to wade through streams and rivulets, or tramp over swampy ground, the whole being very tiring. Clothes were torn by brambles, and hands and faces were cut by sharp-edged leaves of shrubs and grasses.

On reaching the settlement, we found that great preparations were in progress for giving us a grand Mek-ki Mek-ki in honour of our visit. After dinner a party was made up, and about eight o'clock we landed and were received by the governor of Kandavu and some of his officials. There were about 200 or 300 of the natives assembled, dressed out in their best finery, their faces hideously painted black, their bodies bright with red and blue paint, and well besmeared with cocoa-nut oil. The greater part of the men, and women too, wore only the *sulu*, with strips of *tapa*, or dried banana-leaves, dyed in different colours, hung round their loins or suspended across their shoulders like scarves; others were similarly decorated with the green leaves of a strongly scented weed and dried grass. At a given signal all were in readiness, armed with clubs, spears, and battle-axes, which were fantastically decorated with coloured paint; while from their large war-fans, of which a goodly number were displayed, floated long streamers of *tapa*, as delicate and white as the finest muslin. The music was produced by an extensive orchestra, from instruments made of hollow bamboo, which were beaten by short sticks or by striking the ground, and excellent time was kept by singing and shouting. The dancers worked themselves up to a high pitch of excitement, making the most violent gesticulations, and waving their arms about frantically; and the whole scene, being illuminated by the fitful glare of numbers of torches, was one of a most interesting character. On its completion, all returned to the ship well pleased.

The natives are a fine race, and civilisation may develop many good qualities; formerly they were pre-eminently bloodthirsty, ferocious, and cruel. Cannibalism was then indulged in to an incredible extent; and this not from mere satisfaction of revenge,

but to satisfy appetite, friend, relation, or foe equally affording food to the most powerful. These degrading features, however, are rapidly passing away, under the influences of the Christianising efforts of the missionaries, who have been engaged amongst them since 1835.

Our stay at Kandavu occupied over a week ; and on finishing the survey of the harbour, there was nothing further to detain us ; so on the morning of the 10th August, steam was up, and a course shaped through the barrier of reefs encircling the island. When clear, we proceeded for the other side of the island, to pick up the barge, which



MEK-KI MEK-KI COSTUME, FIJI.

was sighted before dark, and soon after its occupants were safely on board. The next day was spent in swinging ship for azimuth and magnetic corrections, in sight of Buke Levu, the great mountain cliff of the island, to-day metamorphosed into "Mount Washington," and before sunset we had lost sight of the group.

Let me now revert to the cruise of the exploring party in the barge, and the great gathering they witnessed, assembled to pay their contributions to the Wesleyan missionaries in aid of their church and religion.

Before starting, they were fortunate in securing the services of

a half-caste, known to the natives as "Dickey," speaking their language thoroughly. He proved to be a capital interpreter, and to be well known by the natives of the villages and towns visited.

Reaching Mbau, the capital, their first endeavours were to obtain an interview with the old king Thakombau, who was found lying on a mat busily employed in reading his Bible. What a difference between the man at 30 and 70 years of age! The old man attempted to be very civil, and being of an inquiring mind, he was anxious to know all about the strength of the navy of the different nations of Europe. His son, Ratu Abel, a fine young fellow, gave great assistance to the party, and permission to use a small island near the town as a camping-ground.

While at Mbau, a visit was paid to the two stones used formerly for braining victims, the first of which, called "*Vatu vi toaki*," was near the landing-place. Here it was usual for the unfortunate victims to be seized by two men (one on either side), each holding an arm and a leg, and run head foremost at full speed against the stone, and so killed. The second stone was used after the "*Bakalo*" (human flesh is called "*bakalo*") Feast to break into pieces the skulls, &c. The evening was spent in drinking *kava* with Ratu Abel, who lived in a separate stockade, containing four or five houses.

The next day the barge pushed up the river on to a village called Noraloa, where was seen a native college presided over by two Wesleyan missionaries (Messrs. Carey and Friend). It contained thirty married and the same number of unmarried natives who were being prepared for the office of teacher.

As the tide rose, the barge followed the windings of the river until reaching Nadawa, and the night was spent at the house of Mr. Paige, who has a small settlement there. Proceeding on the next day, we passed the villages of Udara and Nassourie, and eventually reached the town of Vite, about 35 miles up the river Rewa, where our party was entertained by a German settler, Mr. Stork, who has a sugar plantation of some sixty-five acres, all under cultivation. Mr. Stork and his family were very kind, and no doubt much pleased at the opportunity of exchanging ideas with the outside world.

From here the return journey commenced, and the next morning Udara was again reached. The day had been set apart for the receipt of the annual missionary offerings. Seated at a table in front of the old chief's house, Mr. Carey, the head missionary, recorded the contributions of the native preachers, at the rate of a dollar a head. Then the chief's wife deposited a handful of small silver coin; after which the six villages of the district sent in by representatives,

their cash separately. A number of girls now advanced to the table singing Psalms and the Hallelujah Chorus, and each contributed a small sum. They were followed by the men, and a similar proceeding took place for each village represented.

After all this, a number of natives, in parties of from one hundred to five hundred, danced the Mek-ki Mek-ki in the horrible fantastic dress with daubed faces and painted heads. Here was repeated the fishermen's dance, club dance, war dance, fan dance, and others, as we had seen at Kandavu. All was carried out in good humour, and with great life and spirit, and the sight altogether was most amusing and interesting.

Leaving the river, the barge sailed across to the north side of Kandavu, where she reached Mallato Bay in safety, and there we fell in with her.

Are the missionaries doing good, and are the loud complaints against their actions from all the settlers and traders without foundation? There is not the slightest doubt but that much permanent benefit is done, but the missionary is at times apt to forget his profession, to acquire land, using the privilege afforded from his close intercourse with the chief to enter into mercantile speculation and trade, teach the people to ask higher prices for their produce, and at times enact the Pharisee, thus leading, I fear with some reason, to the outcry often raised against the body.

It is difficult to understand how the opposition to the missionaries from the native heathen priests has been overcome. In the *Tori* *Tonga* and *Veachi*, of the Friendly Islands, and the *Amlutti*, of *Fiji*, the early Christian teachers must have encountered bitter enemies. The natives of the islands which we have as yet visited have been accustomed to pay heavy taxes to the chiefs and to the gods, in the shape of yams, bananas, pigs, &c., and I can therefore understand that to them a material advantage is gained in the additional safety to their lives and property from the presence of the missionary, while the yearly contribution to his purse is a relief from their previous heavier taxation. This is not, however, sufficient to account altogether for the great influence and authority of the Wesleyan missionaries, who are almost autocrats, and as such cannot fail to incur the jealousy of the European trader. What the missionary sanctions is done; what he taboos is not done. Fancy such power in the hands of an unscrupulous man or a religious zealot, and the consequence could scarcely fail to be injurious.

The trip across from Kandavu to the New Hebrides group was uneventful, nor was the run marked by any particular incident, but nevertheless it was in every respect pleasant and agreeable. The

south-east trades wafted us well on our way, sounding and dredging was very frequent; the results showed that the Fijis and New Hebrides are joined by a bank with from 1300 to 1400 fathoms depth of water on it. Other depths showed from 2000 to 2600 fathoms; and on nearly every occasion some new and interesting creature was brought up, thus adding more and more to the already vast collection on board.

On the evening of the 17th, we sighted some of the eastern islands of the New Hebrides, passing very near to Mai or Three Hill Islands, and a small cluster known as the Shepherd group.

Here we hoſe-to, off Tongaicki, and sounded, and later on bore away for Api, the island the least known of the group. Missionaries have been established at other islands, although under many dangers to life and property, but Api has not as yet been brought into the fold; and a great deal of kidnapping has left the remaining natives not inclined to be very polite or friendly to the "papalangi."

We were off Api on the morning of the 18th, and stopped about half a mile from the beach on the south side. Here it was intended to land, if possible, for, before leaving Fiji, a number of labour hands who had completed their engagements were embarked for passage to their homes on this island, which is reported to be one of the most savage of the group. While they were on board, they behaved well, and proved quiet and tractable.

The island, which rises to the height of nearly 2000 feet, is volcanic, and covered thickly with a dense rich foliage; ravines and enticing-looking valleys extend along the mountain-sides.

We soon saw some naked natives walking towards us along the shore, waving palm branches, supposed to indicate their peaceful intentions, but the rest of the crowd had clubs, spears, bows, and arrows.

Two armed boats left the ship, taking all those desirous of visiting the shore, in which also were some of the Api natives we had brought from Fiji, with their treasures. As the boats approached the landing, a curious sort of "Coo-oo-ey" cry was heard, and this appeared repeated along the beach. Our Api man, Toby, soon joined in, and became greatly excited. Eventually we landed without difficulty through the coral reefs, when a dozen or more natives joined us at once. None were encumbered with much clothing; all were more or less armed with clubs, bows, and bundles of arrows.

Toby picked out an acquaintance, and saluted him by holding both his wrists; he was very soon able to count many friends, thanks to his two rifles and box of treasure. By the time our boats were

cleared, the numbers on the beach had increased to some forty or fifty jabbering savages. There appeared to be two chiefs present, one a fine fellow with his club only, the other not quite so fine an animal, fully armed with bow, arrows, and clubs; both wore armlets of boars' tusks. The Captain gave one of them a hatchet, knife, pocket-haucherchief of a glaring red colour, and some tobacco, and so secured his friendship (?).

The Professor, who is stout, tall, and in good condition, took all their fancies, and they really seemed to smack their lips with gusto, and with glistening eyes enjoyed the thought of the feast of "bakalo" he would make, as they crowded round and uttered yells and exclamations. One scoundrel had his nose smeared with yellow ochre; another wore an armlet of white and blue beads worked in a somewhat regular pattern. Otherwise all were in their birthday clothes. The women, who had been keeping at a distance behind the trees for some time, now hove in sight and ventured down one or two at a time to the crowd surrounding their returned countrymen. All were entirely naked, except for wearing the *liku*, or apron, about 8 inches deep, of plaited banana leaves, beyond which no other ornaments were noticed save an occasional bead necklace.

A stick of tobacco was the standard of exchange for a bundle of yams. After a little difficulty we succeeded in buying some of their bows and arrows. Of the latter, one kind we noticed, wrapped in banana-leaf quivers, and poisonous; the others, held in the hand, ready for immediate use, were not such deadly weapons. The poison, I am informed, is procured by dipping the tip of the arrow in putrid human flesh. Although the best feeling towards us seemed to exist, it was considered prudent not to leave the beach or ramble out of sight of the boats and the armed crew. Therefore none of their villages or houses were seen.

The natives are an offshoot of the Papuan race, very dark, almost approaching to black, and not embarrassed with much clothing. They are described as hostile and treacherous in all their intercourse with the white man; therefore, although their manners seemed favourable, they were not to be trusted. The missionaries report the islanders as being amongst the worst they have to deal with in the South Pacific; those who have been labouring amongst them during the past few years have been treacherously killed and eaten. The remainder of the natives we had brought with us from Fiji were afterwards landed: some had been absent for three years, employed on Captain Hill's cotton plantation at Ramby, and had received as payment some 5*l.* or 6*l.* worth of goods. Besides other things, such as calico, a looking-glass, and small trifles, were two

Tower muskets, powder, shot, bullets, caps, and a bullet-mould. The hatchets and knives were of the usual useless kind, manufactured expressly for the South Sea island trade, the edges of which turn at the first blow. The influence of the labour men in civilising their friends must be considerable. Men who have worked side by side on the same plantation are, on their return home, unlikely to continue the hereditary quarrels, which they must recognise as the cause of the desolation of their island. They remain at home generally but a very short time: life, with plenty of good food, even when accompanied with compulsory labour, being preferable to the nearly destitute state of existence to which they have been reduced, in consequence of their family feuds having destroyed most of the plantations.

Confined to the beach, the sportsmen shot a pigeon and some two or three specimens of small birds. A large number of land shells and a few species of lizards were also obtained.

At 4 P.M. boats were recalled, and all hands repaired on board. On leaving, the natives shouted and held up their hands, palms outward, as a salutation. Not an attempt even at rudeness or theft occurred while we were amongst them, and yet these people are treacherous and never to be trusted. Not a canoe or a boat of any sort was seen either afloat or on the beach. We found that nothing could be done here, although, from the fact of this group, comparatively speaking, being but little known, an extensive and careful survey is much needed. It was considered, however, unsafe to remain long amongst such people, and on the boats returning, it was decided to proceed for Torres Straits, distant 1500 miles, and having a capital breeze after us, the land was soon out of sight. During the stay off the island frequent casts of the trawl were made in 50 fathoms, but there was nothing of interest obtained.

The island of Api, which is said to be 60 miles in circumference and 8 miles in breadth, was first seen by Cook, who did not land there, nor does it appear to have been visited by subsequent navigators. Tanna, Mallicolo, and Vati were the favourite spots.

The New Hebrides group was discovered by the Spaniard Quiros in 1606, whilst in search (with an expedition containing miners, artisans, women, and priests) of the great Austral Land. He sighted the largest and northernmost island of the group, and gave to it the name of Australia del Espiritu Santo—to-day the name is reduced to Santo. Entering a bay on the north side of Santo, Quiros, who was well received, attempted to form a colony. The feast of Corpus Christi occurred while they were here, and it was celebrated with great pomp and religious processions. Alcaldes and officers of all

grades were nominated, and ere secure in their newly formed city, the Spaniards had begun, with their usual practice, to attempt to rule the natives with an iron hand. Retaliation ensued, and the colony of forty days' life succumbed. Quiros returned to Spain—which is more than a great number of his followers did—and represented to his government these islands as an earthly paradise, producing everything, and abounding in marble, gold, silver, and all the good things of this world. These old adventures had powerful imaginations.

The religion of the natives was primitive (referring to Aneityum, one of the group, and by inference only to the whole); the great deity was Mugerain, whose progeny, Natinases, filled everything. The real gods, however, were the disease makers, rain makers, and makers of all the ills and annoyances of life. These were most dreaded and duly propitiated.

The natives believed that, in consequence of some act of wickedness, their ancestors had been changed from immortal to mortal—a shadowy idea of the Fall. The women were little better than slaves, and, says Campbell, instead of a wedding ring, a cord was placed round the bride's neck, and always worn by her ready for strangulation at any time or on the death of her husband. So far back as 1839, native Samoan teachers were landed at Tanna, and in 1848 Dr. Geddie and his wife landed at Aneityum, and to-day missionaries are found at Tanna, Erromanga, Fortuna, and Vati. We all regretted that want of time prevented our visiting the other islands of the group, notably Mallicolo, Tanna, and Santo. Each island is reported to have a different dialect and the people to be so divided amongst themselves that on the same beach a distance of only a quarter of a mile apart is sufficient to separate two bodies at enmity with each other.

With a favourable trade-wind, good progress was made. On the 20th we sounded, and, thanks to a depth of 2600 fathoms, no delay has occurred by dredging. A peculiarity appeared in the soundings obtained. The temperature ascertained at 1300 fathoms was 35.7° , and at the bottom, 2650 fathoms, it was found the same; thus there is a stratum of 1300 fathoms the same temperature, and that above the normal one; the bottom being chocolate clay. This has been twice repeated, and the scientists are at work theorising as to its cause, an occupation they are all fond of, and with little fear of their results being contradicted.

We must, so say our theorists, be passing a huge basin of water hemmed in on all sides (at a depth of 1400 fathoms, below which the uniform temperature shows that the water there is not disturbed)

by a ridge extending from New Zealand across Bass's Straits to Torres Straits, and then, turning eastward to a position between Fiji and the New Hebrides, extending south-east almost to the Kermadec group. On the 17th July, we got 2850 fathoms between Kermadec and the Friendly Islands; and similar depths and bottoms were found, in June last, between Sydney and New Zealand. True; but then we were west of this supposed ridge, in a totally different hollow, and so disputations, arguments, and theories follow each other, and after all, we know as little as possible about it. One day we trawled in 2450 fathoms, and the result of our labours, after six hours of weary, weary work, was two umbellularias and three new species of fish, one of which was without eyes.

We were now off the Louisiade Archipelago, and might fairly be said to have entered the Coral Sea—a most expressive and appropriate name for this dangerous part of the Pacific. Frequent soundings showed a depth varying from 2000 to 2500 fathoms as we proceeded on for Raine Island, which was sighted on the 30th. This coral reef is nearly a mile long and about a quarter of a mile wide, showing some 10 feet above the level of the sea. It is an important guide for making the route through Torres Straits, and a beacon was erected on it some thirty years ago. Stretching away from here in a north-west direction are the Great Barrier Reefs, which are probably the grandest and most extraordinary coralline structures existing in any part of the world. A turbulent sea is constantly rolling and causing a very heavy surf to break over the numberless islets and reefs with which the Coral Sea is studded, and which, therefore makes this passage very dangerous, notwithstanding all the recent surveys which have been made.

We anchored in shallow water off Raine Island, a low reef covered with scanty vegetation. On landing, sea-birds were found to exist in vast numbers, rising and hovering above us in clouds thick enough to darken the air. Each description appeared to keep its own selected breeding-place, the nests being on the bare sandy ground, with little or no attempt at building, except on the part of the pretty black and white tern, which prefer to build on the low scrub, slightly raised from the ground. The next day we proceeded towards Bird Islands, where we anchored for the night. They are three low, wooded islets, situated on the margin of a circular coral reef. There were no natives seen either here or on Sir Charles Hardy Islands, which we afterwards passed. On the 1st September we arrived at Somerset, Cape York, the north-east point of Australia. The barren, sandy appearance of the coast, seen through the thick mist which, apparently, always accompanies the trade-wind, as we

ran quickly past, gave anything but pleasing or hopeful first impressions; and this feeling each day's stay at this solitary outpost only served to intensify. The Colonial Government support the small settlement, and the monthly mail between the colony and Singapore makes it a port of call; it is besides of some importance as a station for the numerous small vessels engaged in the productive and increasing pearl fishery, which is carried on in the shallow waters of Torres Straits, and gives employment to a great number of South Sea islanders as divers and boatmen.



STREET ARCHITECTURE, DOBBO, ARRU ISLANDS.

CHAPTER X.

CAPE YORK (AUSTRALIA) TO THE ARRU AND KII ISLANDS, TO BANDA, AMBOYNA, AND TERNATE (MOLUCCA ISLANDS).

The settlement at Cape York—The aboriginal Australians—Foliage and birds—Leave Somerset—Pass through Endeavour Straits—Off Hammond Island—Ceremonies relating to the dead—Australian graves—Off Booby Island—The post-office—Passage to the Arru Islands—Anchor off Dobbo—Visit to the Dutch officials—The settlement, its natives—Forest scenery—Birds of paradise—Leave Dobbo—Passage to the Kii Islands—Anchor off Kii Doulan—The forests—Beautiful birds and insects—Boat-building—The village and natives—Leave the Kii Islands—Pretty scenery—The Molucca Islands—Anchor off Banda—Gunong Api—Banda Neira—Nutmeg plantations—Animals and birds found—Banda to Amboyna—At Amboyna—The city—Get a supply of coal—Chinese burial-places—The harbour—Arrival of the mail steamer—Leave Amboyna—Cross the Equator (second time)—Pass the islands of Bachian and Tawali—Tidore and Ternate in sight—The charming scenery—Anchor off Ternate—The village—Club-house—Sultan's palace—Mohammedan mosque—Visit the spice plantations—Trees and fruits—Ball at Government House.

It would be difficult to explain to an Englishman the sort of place, inhabited by his countrymen, Cape York or Somerset is. In the

bay there are the pretty little missionary steamer *Ellengowan*, just arrived from England, for service of the London Missionary Society in New Zealand, a schooner seized for kidnapping, and a small fore-and-aft vessel recently employed in the *bêche de mer* trade; but on shore I see two houses, wooden bungalows, unoccupied and decaying, one store and grog shop combined, a barrack for four troopers (black) and two or three water police (white), a nigger washer-woman in a wooden hut, and a second bungalow occupied temporarily by two missionaries in training for New Guinea; such is the settlement at Cape York. I looked in vain for the town with its several streets and buildings as shown on the charts—drawn in imagination as Dickens' Eden was. Except a bullock, not a vestige of supply is procurable, not an egg, not a cocoa-nut, nor a yam. Somebody is at fault somewhere.

The Colonial Government has for some time past been endeavouring to establish a settlement here, but the soil is found to be very poor, and the climate anything but healthy. The chances, too, of frequent skirmishes with the savage natives from the adjacent islands make it far from a desirable locality for settling. Failing the response of the Queensland Government, it seems probable that Somerset will very soon disappear from the charts, and the settlement, if it can be so dignified, be given up. Certainly the energy of the Englishman is wanting here.

The police magistrate and chief man combined was absent, and the representative of the nation is an ex-sub-inspector of constabulary, who combines in his person the office of chief of the police, governor, postmaster, missionary agent, customs agent, and, last, but by no means least, storekeeper and vendor of the only provisions in the place.

I frequently landed, and had opportunities of seeing the country in the immediate vicinity. It appears to consist of low, wooded hills, valleys, and plains of great extent; the coast-line, when not consisting of rocky headlands, being either a sandy beach or swamps fringed with mangroves. On the plains, characteristic of the poor soil, the first objects to attract attention are the enormous pinnaced ant-hills of red clay and sand scattered profusely about on each grassy slope. These singular structures, some of which are 10 or 12 feet in height, seem of great strength and toughness; on breaking off a piece, they appear to be honeycombed inside, the numerous galleries being then displayed. The ants themselves are of a pale brown colour and about a quarter of an inch in length.

The remnants of a tribe of aborigines was found in the scrub, a few hundred yards behind the settlement; poor, miserable, wretched

specimens, the lowest, perhaps, in the scale of humanity. Their dwellings, if such they can be called, are formed by a few bushes, behind which they creep for shelter. Spread on the ground are their dirty blankets, while a small fire smoulders in the centre. A few utensils—baskets made from stems of a rushlike plant, and a large shell or two for drinking and cooking purposes—comprised all their belongings. I shall not easily forget my first visit to the camp. This was the first place in our wanderings where we saw the natives absolutely in their birthday suit; seemingly they had not arrived at the first or simplest form of civilisation, and apparently without any ostensible means of subsistence except that derived from the few shell-fish, lizards, and insects they manage to secure. The good South Sea custom of using lime-wash as a cleansing element to a head of shock hair has not reached Cape York, and parasites of every form are plentiful on the persons of both sexes. Some of the men had their hair curled in numerous plaits, but the generality allowed Nature to take her course. A few of the young women—"gins" as they are called in Australia—we saw were not so repulsive; but the older ones were little better than skeletons, and a pitiable sight to behold. The missionaries have given up any hope of improving these fellow-creatures, who have no religion, no belief except one in a good and evil spirit, and who live to-day totally heedless of to-morrow, either as regards occupation, food supply, or destiny. A few more cases of gin, and a few more years will see the last of them.

Their weapons are the wooden spear, which they use with a throw-stick, called a "woomerah," and a few bows and arrows; the boomerang and waddy, or club, they know nothing of, and stone implements are equally unknown. We found the men were good guides in the woods. They show an extraordinary aptitude for noticing animals or birds. Being in a state of nudity, they walk amongst the dry scrub without producing the least noise, and this faculty enabled them to approach the birds, &c., when we utterly failed. The woods around the settlement were well explored during our week's stay, and very much of interest was obtained.

The dull and sombre vegetation of Australia spreads all over Cape York and the immediately adjacent islands. Wide forests of large but ragged-stemmed gum-trees, with their almost leafless and quite shadeless branches, are the principal characteristics of this vegetation; here and there are gullies with jungles of more umbrageous foliage, and a few ragged, stunted palms. Across the straits, on its northern shore, the contrast is very great, for travellers tell us not a gum-tree is to be seen, but that the woods are close

and lofty, and afford the deepest and most refreshing shade, and are often matted into impenetrable thickets by creepers and undergrowth, and adorned with varied foliage, such as cocoa-nut, plantain, bamboo, and other plants, not only useful, but also beautiful.

Birds were plentiful, and very interesting, and I now saw for the first time many new species which are quite distinct from those previously met with. White and black cockatoos were abundant, and their loud screams, conspicuous colour, and pretty yellow crests rendered them a very important feature in the landscape. Besides these were white pigeons, beautifully coloured parrots and lories, thrushes, leatherheads, the gorgeous rifle-bird, and some thirty or forty others. Amongst this strange lot were the mound-makers (*Megapodius Gouldii*), which are found here and in the surrounding islands. They are allied to the gallinaceous birds, but differ from them and from all others in never sitting on their eggs, which they bury in mounds of sand and rubbish, and leave to be hatched by the sun or by fermentation. Several of these birds were shot by our party, and all seemed to be characterised by very large feet and long curved claws, which probably enable them to scratch together all kinds of rubbish, dead leaves, sticks, stones, rotten wood, &c., until they form a large mound, often 6 feet high and 12 feet across, in the middle of which they bury their eggs, which are of a brick-red colour, about the size of a swan's. A number of birds are supposed to join in making these mounds, and lay their eggs together; so that sometimes as many as forty or fifty are found in one mound. These nests are met with in the densest parts of the forests, and at first we were quite puzzled as to who could have gathered together these heaps of rubbish in such out-of-the-way places; for it would seem the wildest romance to believe that it could have been done by birds that are not much larger than the ordinary turkey.

On the morning of September 8, the *Challenger* turned her head down Torres Strait, and before noon the mainland of Australia was out of sight.

During the evening the anchor was dropped off Hammond Island. There is some talk of this being the site of the future Eden when the settlement is removed from Somerset. There are certainly advantages here over the present situation, one of which is the position it occupies as being directly in the track of vessels passing through the straits. The following morning several parties landed on the next island, all well armed and prepared for any contingency, such as a skirmish with the natives; but if there were any there, they kept out of our sight, and we walked through the woods

unmolested, collecting botanical specimens, and shooting the few birds that were seen.

While roaming about near the beach, we saw some of the natives' graves, and were informed that they have some peculiar ceremonies relating to the disposal of their dead. After death it seems the remains are kept with the tribe until decomposition sets in, when the bones are carefully removed, painted red, and wrapped in bark; they are then, with some ceremony, deposited in the grave, which consists of a mound of sand around which a trench is dug. A stout post is fixed upright at each of the four corners, and the sides are usually ornamented with large shells, skulls, and bones of the dugong. Evidences were not wanting here that a camp of the natives had been but recently broken up; and as the day advanced, it was decided to return on board, for the vessel had anchored a few miles off, after having had an afternoon's dredging.

Weighing early on the morning of the 9th, we had not proceeded far when the mail steamer from Singapore to Brisbane was signalled. On closing and communicating, we found there were no letters for us. Hove-to during the forenoon, and dredged with success in from 6 to 13 fathoms, off Booby Island. A party of explorers landed for shooting, and to look up the "Post Office." It seems in former days, when mail steamers were not so plentiful as they are now, a tin box was placed in a rough log shanty for the reception of letters from or for ships passing through the Straits, and doubtless in its time this has been of great service. The island was scarcely worth a visit; vast quantities of gannet were seen, and in the "Office" we found some notes from the master of the barque *Banda*, of his cruise from Sydney *en route* for Hong Kong, and a letter describing a sunken rock found in the straits and not indicated on the charts.

On the boats returning, we proceeded on our way for the Arru Islands. For some eight days we cruised on a north-westerly course, having frequent successful dredgings and trawlings. On the 15th, after passing a small detached coral reef, course was altered as requisite for the island we were bound to. The group extends from north to south about 100 miles. Its eastern limits, however, are but imperfectly known. The islands seem low and swampy, but, from being well wooded, have the appearance of being much higher than they really are. On first sight, they appear as one continuous low island, but, on nearing, intricate channels are found winding amongst them, through which set strong tidal currents.

September 16.—We stood along the land all night, and early on the morning of the 16th were off the entrance of Dobbo harbour

situated between the two islands of Wamma and Wokan, and during the forenoon anchored off a low sandy spit. Immediately after we were visited by the Malay officials in their gay and pretty state dresses, their prahs being decorated with many flags, and their approach announced by the sound of the tom-tom and shouts of the rowers. Others who came on board afterwards looked and seemed remarkably awkward and out of their element, probably because they felt dressed up for the important occasion; for every one, it seems, holding a government appointment (under the Dutch) *must* appear dressed in a black suit when paying official visits. It was with the utmost difficulty we kept from laughing when it was expected we should look very solemn at their reception, for some of our visitors appeared in costumes apparently of the last century, in long-tailed coats which trailed on the ground, for which they had assuredly never been measured, or with sleeves so long that the tips of their fingers could scarcely be seen. But their hats were the treat to see, for each sported a chimney-pot of some distant age, which was, in some cases, three or four sizes too large for the wearer, and to make a fit, a large pad of paper or rag had been introduced. After fulfilling their mission on board, they were glad to hurry away, and could be seen stripping off their official dress on their passage to the shore.

These islands are situated on the south-west coast of New Guinea, quite out of the track of all European trade, and are inhabited by black mop-headed savages. We anchored off the trading settlement of Dobbo, which the Malays and Chinese annually visit for procuring the birds of paradise, &c., and afterwards landed on the beach, along which a luxuriant grove of cocoa-nut trees extended for more than a mile. Under their shade were the houses, arranged with much regularity, so as to form one wide street, from which narrow alleys branched off on each side.

The people who thronged the shore were of a dark brown colour, many with large rough heads of hair; besides a few Papuans, Malays, and Chinese.

From what could be seen of the natives, they appeared to be a strange race, with an intelligent expression of countenance. Their dress consisted of a cloth round their waist, reaching to their knees; their arms and ankles were decorated with rings made of wood, shell, beads, or coloured glass. The lobes of their ears were perforated with large holes, from which enormous earrings were suspended, sometimes two and three in each ear. They wore necklaces and finger rings; and all appeared to have a band of plaited grass tight round the arm, to which they attached a bunch of hair or bright-

coloured feathers, by way of ornament: this seemed to complete their ordinary decorations.

At the southern extremity of the landing-place the sandbank merges into the beach of the island, and is backed by a luxuriant growth of lofty forest trees. Though at first sight it seems a most strange place to build a village on, it has many advantages by being fully exposed to the sea-breeze in three directions, and is usually very healthy in consequence.

The houses are all built after one pattern, being merely large rude sheds supported on rough and slender posts; no walls, but the floor raised to within a few feet of the eaves; the roofs neatly thatched with palm-leaves, and formed with a very steep pitch, projecting considerably beyond the lower side, surmounted at the gables by large wooden horns, from which long strings of shells hang down, giving the village quite a picturesque appearance. This is the style of architecture usually adopted. Inside there are partition walls of thatch forming little sleeping-places, to accommodate the two or three separate families that usually live under one roof. A few mats, baskets, and cooking utensils, purchased from the traders, constitute the whole of their furniture: spears and bows are their weapons. The women, except in their extreme youth, are by no means pretty. Their strongly marked features are very unfeminine, and hard work, privations, and very early marriage soon destroy whatever beauty they might ever have possessed. Their toilet is very simple, consisting solely of a mat of plaited grass, or strips of palm-leaves worn tight round the body, and reaching from the hips to the knees. This is the universal dress, excepting a few cases where the Malay *sarong* has come into use. Their hair is frizzled and tied in a bunch at the back of the head.

The forest scenery possesses a brilliant and varied vegetation; the beautiful *Causurina* tree, luxuriant groves of cocoa-nut, and palms of graceful forms were seen everywhere, while climbing ratans formed entangled festoons from almost every forest tree. Here the lovely bird of paradise, and scores of others with gorgeous plumage, flew in and out amidst the bright green foliage, forming a magnificent sight.

From an early hour in the morning the forests are all alive with lories, parroquets, and cockatoos, whose shrill screams and cries resound through the woods; while numerous smaller birds, many of the most lovely form and colour, chirrup and whistle all the day long.

Amid this beautiful forest scenery we remained for a week, while

daily excursions were made to the other islands of the group, and large numbers of very beautiful birds obtained, including many varieties of the rich-plumed birds of paradise. So gorgeous and beautiful are some of these (the king-bird) that the natives name them God's birds.

In the larger houses we found our Malay visitors shorn of their finery, but all politeness and evincing a desire to be of service. Of the women, very little was seen; the approach of any of us was always the signal for a general stampede. In the streets we met many of the natives of Arru, tall, fine men, with mop-like heads of hair and skins as dark as the Papuan slaves, who, on the other hand, were short and bullet-headed, with their hair close-cropped. Chinamen were the shopkeepers, and soon in answer to our demand produced the birds of paradise they had for sale, asking sixteen shillings for each skin. The natives mount the highest trees, where they lie on their backs watching for these birds, which they shoot with a button-headed arrow, so as to avoid injuring the skin. They then remove the body and head and smoke dry the remains, which they dispose of to the trader. Pearls were offered us, but although of inferior quality, they wanted a high price for them. Pearl-shell and tortoise-shell completed their articles of commerce. A cassowary and a ground wallaby, both indigenous to the group, and rare in museums, were purchased; and on the first day of our stay, the sportsmen fell in with a cuscus, many beautiful lories, and a king-bird of paradise. Supplies were found to be very scarce and expensive; a few eggs and fowls, with an occasional bunch of bananas, were all that could be obtained.

During our visit, a large party started in the steam pinnace for an island where the Dutch Government have established a coaling station, and afterwards for a spot called Wannambai, about 15 miles distant. Here a large number of native Arruans were met with, and, after guides had been procured, the country was scoured for birds, as well as mangrove swamps and thick bush would allow. Three king-birds of paradise, a small crimson species with two long tail-feathers, many pigeons, and kingfishers were also shot. Some lovely butterflies, peculiar to this island and New Guinea, were caught, and well repaid the trouble of procuring them.

The Chinese traders, while sorry at our short stay amongst them, would not abate the least amount in their prices of the bird-skins, and seized the opportunity afforded them of getting as many sovereigns as they could from us.

On the last boatful of us leaving the beach, an Amoy man, who

spoke a little "pigeon English," besought the Paymaster, with that peculiar cunning look these Celestials can assume, that he (the Paymaster), when the vessel returned to England, would speak to the headman there, and pray him to send out an English consul to Dobbo, for if he would, the Chinese traders there would get fair play and better treatment than they now obtain. Is it not strange what confidence these people have in getting justice where there is an English consul?

All were sorry to leave these fascinating shores, for the many pleasant cruises in the steam-pinnace up the rivers and to the adjacent islands, together with the good sport in the forests, made the time pass very agreeably; but on the 23rd September we were off again, steaming along the land, which appeared very lovely and fertile, rising abruptly from the ocean, with its green hills piled gracefully together, presenting a mass of evergreen vegetation most grateful to the eye. Flying-fish were very numerous; they appear to be a smaller species than those of the Atlantic, and more active and elegant in their motion. As they skim along the surface, they turn on their sides, so as to fully display their beautiful fins, taking a flight of more than 100 yards, rising and falling in a most graceful manner. At a little distance they exactly resemble swallows, and no one who sees them can doubt that they really *do* fly, not merely descend in an oblique direction from the height they gain by their first spring.

The greater part of the day was spent in trawling, the sounding giving 800 fathoms; but although the trawl was not well filled, yet the few things obtained were very good.

The next morning, thanks to a strong current during the night, the high land of the Great Kii Island was in sight. As we neared its shores, several canoes, with large flags flying and tom-toms beating, came alongside, the occupants eager and anxious to come on board, which they did without much persuasion. The chief men were Malays, with the quiet manner, apathy, and cringing attitude peculiar to their nation; the boatmen were noisy, lusty fellows, eager to see and pry into everything. Most of the natives, we observed, were suffering from a skin disease supposed to be from the effect of a diet without rice or proper vegetables, of which there had been a scarcity.

Sailing along slowly, the canoes easily kept up with us, and at sunset we anchored off a village called Tamaudam, situated on low land, with islands around, the whole forming what appeared to be a large coral stoll or circular reef. In a very short time, a Malay in "store clothes," a short, venerable, nice-looking old fellow, came off

with a message from the rajah, sending his compliments and begging as many as possible to land. The boat's crew came on board, and after their curiosity had been satisfied, by going aloft and about the rigging, they were started to dance to their own music. In the meantime, another boat had come alongside, and its occupants were soon on board. The group of thirty dark forms made a picturesque sketch as they all squatted on the upper deck. The first dance was a movement of the body and arms, slowly, quietly, and gracefully; the second was intended to represent a fight, each being armed with a bamboo sword and shield. This was curious enough. Perfect time was kept by the dancers, whilst the chorus informed us in an improvised ditty that they would be enabled to dance so much better for a glass of grog. After that had been administered, they all went on shore very merry, attempting a hurrah on leaving. The next morning, we shifted our position to Kii Doulan. Off this village we anchored in a passage between two islands, about 300 yards from a white sandy beach with a background of palms, cocoa-nut and trees of many shades of green, interlaced with flowering creepers, an exceedingly pretty and characteristic spot. The village, with its quaint mosque, large banyan-trees, boat-building sheds, and novel-looking thatched houses on piles, completed a picture well worthy of being conveyed to canvas.

The town was inclosed within the remains of a high wall, and contained about fifty large houses built on piles. The women, as usual, were stowed away out of sight, but the boys and men were present *en masse*. The mosque was in a dilapidated state as regards its internal fittings, whilst its verandah was occupied by the village barber in full swing for the approaching Sabbath.

The island is long and narrow; it appears to be everywhere covered with luxuriant forests, and in its bays and inlets the sand is of dazzling whiteness, resulting from the decomposition of the coralline limestone, of which it is entirely composed. In all the little swampy inlets and valleys, sago-trees abound, and these supply the main subsistence of the natives. The forests afford abundance of timber, though not probably more so than other islands, and, from some unknown causes, these remote savages have made boat-building their study, in which art they pre-eminently excel. Their canoes and prahs are beautifully formed, broad and low in the centre, rising at each end, where they terminate in high, pointed peaks, more or less carved, and ornamented with shells and waving plumes of cassowary's hair. They are not hollowed out of a tree, but are regularly built of planks running from end to end, accurately

fitted together without a nail or particle of iron being used, the planks being dowelled together with wooden pegs, as a cooper fastens the head of a cask, and the whole afterwards strengthened by timbers, lashed with split rattan to solid cleats left for the purpose in each plank.

The village had a pretty appearance as seen from the anchorage; but on landing the illusion was soon dispelled. There seems to be but little care or cleanliness in or around the houses; but a ramble through the beautiful forests, hunting for plants and insects, many of which were altogether unknown, was very enjoyable.

The most beautiful butterflies were seen cruising about the place, and as soon as possible after anchoring, parties were away in every direction. In the bush, walking was not at all difficult. A lot of narrow footpaths had been cleared, and the absence of swamp was a pleasing feature. Ferns in profusion, gaudily coloured flowers, palms, and numberless high forest trees, with their different shades of green, made a feast for the eye. Even the insects adopted the rich colouring of their home; the dragon-fly here put on a body of crimson and wings of orange, while the small lizard was a brilliant blue, and the beetles either scarlet and blue or mottled in white, black, and blue. There were butterflies of every shade and combination of colour, some 6 and 8 inches across the wings; and the bright-hued lories, with their noisy screams, contributed to produce a condition of things so totally different from every-day life that one could scarcely realize that he was still after all in a half civilized island and an unprofitable country.

There are famous large pigeons (over two pounds in weight) met with here, living on "nutmegs, and spice, and all that's nice," and of these some twenty were shot. When our party mustered on the beach to go off after their day's sport, the medley of articles collected was surprising. One had a large collection of beautiful ferns, and forty varieties of butterflies, insects, and beetles; another's stock consisted of several lories, amongst which was a scarlet one, and two or three green and yellow species; another had nine nutmeg pigeons, and two new species of bird (unknown). The botanist had a goodly collection of plants and a large red lorie, some pigeons, curlew, and a giant lizard. More pigeons by two others; and then the naturalist with more birds, a large lizard, a crab, and several bottles of insects, beetles, and spiders. Our medium of exchange with the natives was at first tobacco, handkerchiefs, and sixpenny knives; but they soon overcame their reluctance to take English silver. The guides—and they were numerous—were intelligent, well-behaved, quiet, and zealous.

Altogether, the visit to Little Kii was a success, and we could have well remained another week. Anchor was weighed this morning (September 26) at daylight, and we proceeded amongst a group of beautifully wooded islands, many of which were either unknown or incorrectly laid down on the charts; so a running survey was made of this archipelago as we slowly cruised on, threading our way in and out amongst coral patches and pretty little islands. On the morning of the 28th we sighted Bird Island, which proved to be 30 miles away from the position assigned to it on the charts. The soundings, at a distance of about 10 miles from the land, gave 2800 fathoms, with a temperature of 38° the same from 800 fathoms to the bottom; this is unusually high at this depth.

Thus three days of most pleasant cruising passed. On the morning of the 29th we could see the volcano of Gounong Api (Fire Mountain); the different islands of the Banda group slowly rising into sight as we neared the land. In the forenoon dredging and trawling were carried on close to the shore of one of these islands, in 200 fathoms, with wonderful results. Amongst the choice things brought up was included a *Spirula*, the *second ever taken alive*. The first was not examined until dead, and is at present in the British Museum. The second the trawl has just secured. The specimen, although alive, was slightly injured, and so champagne all round from the Professor was postponed until another specimen is obtained.

The *Spirula* is a small, spiral shell forming the internal skeleton of a cuttle-fish. The shell is found in very large quantities on the beaches in many tropical climates, without any signs of the animal, whose form was unknown until now, except by conjecture. The trawl also contained some rare crinoids and other beautiful specimens of marine life. So there was joy amongst the scientists.

The largest island near us was high and thickly wooded, the groups of cocoa-nut and banana trees showing that cultivation was going on. Every spot appeared covered with an unusually dense and brilliant green vegetation, indicating that we had passed beyond the range of the hot, dry winds from the plains of Central Australia. Two or three pretty little bays, or creeks, with dazzling white sandy beaches, indented the "steep to shore."

As we proceed, on passing the shores of Great Banda, composed seemingly of a series of perpendicular crags from 200 to 300 feet high, covered with luxuriant vegetation hanging down in festoons of bright green unfading verdure to the water's edge, a beautiful sheet of water is disclosed, like an inland lake, showing up the northern shores, covered with dense, matted masses of foliage, while

scattered about ahead are two or three small islands, with the swell chafing their abrupt sides as they rise out of bright blue sea, which is only ruffled here and there by light breezes, or flecked by shadows from the fleecy clouds that slowly cross the sky.

Banda is a lovely little spot, its three islands inclosing a secure harbour, from which no outlet is visible, and with waters so transparent that living corals, and even the minutest objects, are plainly seen on the volcanic sand at a depth of 7 or 8 fathoms.

We anchored within the circle formed by these islands, between Great Banda and Banda Neira, at the foot of Gunong Api, a conical active volcano, said to be 2300 feet high.* Banda Neira is in full view before us. It is composed of hills, which gradually rise in a succession of ridges to the height of about 500 feet, covered with beautiful vegetation to the very top. On one of these prominent positions is Fort Belgica, with bastions surmounted by circular towers, resembling some old feudal castle, from which flies the Dutch flag. Its walls are white and dazzling in the bright sunlight, and beneath is a broad, neatly clipped glaxis, forming a beautiful green descending lawn. At the foot of this hill is Fort Nassau, which was built by the Dutch when they first arrived, in 1609. On either hand, along the shore, extend the chief villages of Neira, with rows of pretty shady trees on the *bund*, or front street, bordering the bay; while at some little distance behind the beach are spice plantations and large groves of cocoa-nut trees. In front of our anchorage the town stretches along, consisting of scattered houses, with not much signs of regularity. One or two roads run up the valley, where are pleasant groves of orange, tamarind, nutmeg, bamboo, banana, and other stately tropical trees and plants, lending their shade and beauty to the scene, which with the white walls and red-tiled roofs of the houses, together with the many strange faces and still stranger dresses, formed a marked contrast to anything we had hitherto seen. These natives are apparently a very mixed race, and probably three-fourths are made up of Malay, Papuan, Arab, Portuguese, and Dutch. The first two form the larger portion of the inhabitants, but the dark skins and the more or less frizzly hair of the Papuans appear to predominate.

During our stay here, the governor (or resident, as he is styled) made up a party to visit the nutmeg plantations on Great Banda. The steam-pinnace was in requisition, and a most enjoyable trip we

* Some of our party, during the stay here, ascended to the top of the crater. They reported the height by barometer to be 1650 feet, with an angle of elevation of 33°50'.

had, for, on reaching the landing, horses were provided to take the party the remaining 8 miles to the gardens. And what a treat was here afforded us, for there are few cultivated plants more beautiful than nutmeg trees. They are handsomely shaped, growing to a height of 20 or 30 feet, with bright glossy leaves, and bearing small yellowish flowers. The trees were now in full bloom, and in a few weeks the fruit would be ready for picking. It is in size and colour somewhat like a peach, but rather more oval, and of a tough, fleshy consistence. As it ripens, it splits open, showing the dark-brown nut within, surrounded with the crimson mace, forming a very beautiful object. The nutmeg trade was for a number of years a strict monopoly; recently the monopoly has been given up. The indignation at one time expressed against the Dutch for destroying all the nutmeg and clove trees on the many islands then covered with those valuable spices, in order to restrict the cultivation to the two or three that they were able to watch over, showed a narrow-mindedness in the Government of that time which has since happily passed away. After spending some hours here, we returned to the vessel, well pleased with the day's recreation.

The visit to the spice plantations having been reported on so favourably, a second party was made up for the purpose of visiting Comber, of which Mr. Hartog is the proprietor. Here we were most kindly received; the owner did the honours, and his wife, a pleasing Javanese lady, brought out preserved nutmeg and all sorts of curious conserves for us.

There are about one hundred employés on the estate, which is almost a small village, and the owner's house is quite in Oriental style, with European additions for comfort even to a billiard-table.

The scenery is rich in foliage and the perfume delicious. We saw the nutmeg stripped of its covering of mace, then kiln-dried, and the kernel covered with lime and packed with much care in the market—the lime is used to prevent insects from thriving. All the arrangements were very primitive, but quite effective. To this business was added the washing and pressing of the nut of the canari tree, the oil of which makes a sort of butter. This nut in its raw state is pleasant to the taste, and not unlike an almond in appearance—I refer to the kernel only.

The only export from Banda would seem to be nutmegs and mace, the imports Manchester goods.

The garrison consists of about two hundred Javanese soldiers, with European officers who keep the *Penitans* (convicts) in order, and guard over the safety of the place; whilst the people gamble much, and lead a seemingly pleasant, indolent life, undisturbed by events

of the outer world. A monthly mail brings news, beer, Schnaps, and letters from fatherland; and what more can a man want in a climate with an average temperature of over 85° Fahr.?

I must not forget to mention that, while at Comber, we were shown a fine collection of Malay musical instruments, gongs, drums, bells, and musical glasses. Only the "glasses" were wood; they were in perfect tone and full-sounding. The collection had been made at great cost by the owner for the use of his people at feast times.

Shooting parties left for the interior, as it was reported that the forests contained deer, pig, and a species of cuscus; but none were met with. Of birds, the naturalists collected some seven or eight species; the most remarkable being a fine and handsome fruit-pigeon, which feeds upon the nutmegs, or rather on the mace, and as we strolled through the forests, its loud booming note was continually heard.

October 2.—All hands were on board at noon, and after a delay of a couple of hours for any letters the good folks of Banda might wish to send to Amboyna, we proceeded on our way. The sea was beautifully calm, and the bright sun and clear sky threw a flood of golden light over all. The next day the ship was over a spot marked on the chart as 4000 fathoms, and great was the preparation for trawling in this the deepest water yet known. A trawl with 4800 fathoms of rope was veered astern at daylight and allowed to sink slowly, an operation occupying some four to five hours. And then four hundred weights of sinkers were attached to the sounding-line, which was allowed to run out. To the astonishment of the authorities, the line ceased running at 1425 fathoms, and the 4000 fathoms* (the deepest hole in the world) proved to be only 1400. The error is probably a typographical one, but the annoyance to us was none the less. Some twelve hours were thus wasted before the trawl and the five miles and a half of rope were again on board. The trawl contained an average haul, including two enormous *bêche de mer*, about a couple of feet in diameter, and several of the glass rope sponges first sent home from Japan.

October 4.—The island of Amboyna in sight. Some hours were spent swinging for magnetical purposes, much, I should say, to the astonishment of the people on the shore, who could scarcely understand a foreign ship of war turning about in every direction near their town.

A little before sunset the anchor was dropped within 600 feet of

* The reputed work of a Dutchman in 1840.

the shore in 25 fathoms, and official visits paid to the governor. The next morning we saluted the Dutch flag, which was duly returned.

The island consists of two peninsulas, so nearly divided by inlets of the sea as to leave only a sandy isthmus about a mile wide near the eastern extremity. The western inlet is several miles long, and forms a fine harbour, on the southern side of which is situated the town, backed up by high hills rising abruptly from the sea. Along the shore are many little bays, where coasting-vessels and prahs were seen at anchor. Viewed from the anchorage, the city has a pleasing appearance, its streets being broad, straight, and well-shaded, with numbers of roads set out at right angles to each other, bordered by hedges of flowering shrubs, and inclosing country-houses and huts embosomed in palm and fruit trees; and, with the high land forming the background, there are few places more enjoyable for a morning or evening stroll than the sandy roads and shady lanes in the suburbs of this ancient city.

Landing on the mole in front of Fort Nieuw Victoria, we passed through this old stronghold out into the pretty lawn beyond, which is surrounded by officials' and merchants' residences. Nor must I omit to mention the Societat, or club-house, which occupies a prominent position just opposite the fort. It appears that every place of any pretension to size in Netherland India has one or two of these pleasant resorts, where newspapers and periodicals are received, and all the social Europeans gather in the cool of the evening to enjoy each other's society, or smoke and drink their favourite gin-and-bitters. Through the courtesy of the resident, invitations were extended to the "Challengers" during their stay in port, and thus opportunities were afforded of passing some pleasant evenings, especially when the band played.

The Dutch Government have a large coal depot here. One day we proceeded farther up the harbour for the purpose of taking in a supply, lying alongside a jetty during the operation; it was, however, a slow and tedious process, for no inducement could make the coolies get in anything like a reasonable quantity per day.

It was a pretty place, and as additional facilities were afforded us through lying alongside a pier, many excursions were taken. A small market or bazaar had been established close to the ship, and everybody with anything curious brought it for sale. Such a perfect *omnium gatherum* is, I should fancy, seldom found: stags' horns, feather flowers, fruit, vegetables, eggs, fish, cockatoos, lories, cassowaries, &c. Each man or woman owning a small lot, only perhaps to the value of one or two dollars, which they have tramped 3 of

4 miles with, to sell to the "Englise man with plenty monnee." All along the beach are small groves of cocoa-nut palms, which furnish food and shade to the natives dwelling in their huts beneath. Away at the back are the favourite burial-places of the Chinese, whose tombs are curious horseshoe-shaped inclosures, their white walls being very conspicuous objects on the hillside; while scattered far and near are numerous little plantations filled with small trees which have a bright green foliage. These are the gardens of clove-trees, which have made this island so famous throughout the world. On the completion of the coaling we returned to our first anchorage off the town. The passage down the harbour afforded one of the most astonishing and beautiful sights to behold. The bottom was absolutely hidden by a continuous series of coral, sponges, actiniae, and other marine productions of varied forms and brilliant colours; the waters were clear as crystal, and the depth varying from 8 to 10 fathoms. All along the uneven bottom were rocks and stones, offering a variety of stations for the growth of these animal forests. It was a sight to gaze on for hours, and no description can do justice to its surpassing beauty and interest. It had generally been considered that this coast was particularly rich in all kinds of marine productions, such as corals, shells, and fish, but the results of our dredging outside the harbour did not in any way prove such to be the case, to our great disappointment, although, certainly, we got a few good specimens of an echinus of which only one of this species is known to have been previously obtained. During our stay the mail steamer arrived. This seemed to be almost the only chance to break the dull monotony of a residence in this enervating climate, unless an earthquake happens, which affords a grand opportunity for something to talk about to new arrivals.

Everything of interest was visited, for the Dutch officials were ever attentive. One day we visited the cemetery, a pretty spot, where we saw the clove, nutmeg, cocoa, cajaput, and coffee trees growing, the honours of the locality being done by the "King of the Dead," as the Dutch called the old sexton.

Amboyna is noted for its shells. A Chinese dealer was visited by the Professor, to see his collection, which consisted of thirty-four boxes, containing some hundred varieties. Some of them were exceedingly good, and the whole collection had, in the Professor's opinion, a market value in London of about £20. The Chinaman only wanted £250, and laughed at the offer of a pound a box. This is a good enough sample of the fancy prices foreign curiosities sometimes cost.

Supplies were found to be extravagantly dear, vegetables over a shilling a pound, meat half a dollar, and bread 10d. a pound. The coal we obtained from the Dutch Government (Newcastle) was charged at the rate of £3 3s. 4d. per ton.

Life at Amboyna, and at almost every other place of the Dutch possessions, at the best is dull. Once or twice a month the resident gives a reception, when all the Europeans and most of the Mestizos come and dance till late; and as there are some seven or eight hundred people in the city, and the larger portion are usually invited and attend, it is frequently a brilliant affair.

We had been here six days when it was determined to make a move from the anchorage. Accordingly, all was ready, and on the morning of the 10th October we were again under weigh, steaming through beautiful calm seas, with numerous islands of varied form and size in sight, sounding and dredging daily with most satisfactory results. On the evening of the 13th we crossed the Equator, and on the next day passed the islands of Bachian and Tawali, which are great volcanic masses heaved up into ridges about 1000 feet in height, and separated by a long, narrow strait abounding in the grandest scenery. Here on Bachian the clove tree grows wild. North of this island is Makian, an old volcano; in fact, we were just then surrounded with extinct craters. The next day (14th) we passed through the channel separating Tidore, with its high, prominent peak, from that of Ternate, and late in the evening anchored in the well-sheltered bay, off the village of Ternate, situated at the eastern declivity of a volcanic mountain 5000 feet high. This is one of four or five conical volcanoes, which skirt the west coast of the large and almost unknown island of Gilolo. The town is concealed from view until close up to the anchorage, when it is seen stretching along the shore at the very base of the mountain. Its situation is fine, and there are grand views on every side. Opposite is the rugged promontory and fine volcanic cone of Tidore; to the east is the long, mountainous coast of Gilolo; while immediately behind the town rises the huge mountain, sloping easily at first, and covered with a thick grove of fruit-trees, but soon becoming steeper, and furrowed with deep gullies almost to the summit, whence issue faint wreaths of smoke. The scene looked calm and beautiful, although beneath are hidden fires, which occasionally burst forth in streams of lava, but more frequently make their existence known by earthquakes, which have on several occasions devastated the town. It was in 1840 that the last great eruption took place, and destroyed everything within reach, inflicting a loss of something like £100,000; but after a

while the present town sprang up on the ruins, and now contains about nine or ten thousand inhabitants.

On first approaching the settlement, it is difficult to distinguish its size nestled amongst some splendid description of high, wide-spreading trees forming an avenue which extends for nearly a mile. The Dutch quarters seem very insignificant. It is not so in reality, and I again admire the good sense of the stolid old Dutchmen in avoiding the mania for clearing the bush, so much in vogue in America.

On landing, we found the house of the resident near at hand, a large roomy bungalow, prettily situated and surrounded with beautiful foliage. Calling on his Excellency, we were most courteously received, and he extended all civility and combined a happy knack of making himself agreeable. He at once told us that he had followed the cruise of the *Challenger* with much interest, and he was prepared to do everything to make the stay of the expedition pleasant to its members.

Ternate has been visited by several naturalists, and their reports naturally raised our expectations high, and imbued us all with a taste for collecting. Added to this, there is a regular trade with New Guinea, and we found bird skins were plentiful and not exorbitantly dear; over sixteen specimens known as birds of paradise were obtained, besides some racket-tailed kingfishers peculiar to these localities. The Arabs were the principal dealers, and a bargain with them required much patience and an occasional joke or fun during the transaction. Amidst the greatest good-humour, our purchases of birds were made, and only one given as backshish was a swindle, the tail feathers having been carefully tied on. The most brilliant red and green lories and parrots were offered for sale alive with tints of perfect colour, and numbers were secured at a cheap rate.

Along the front, passing Government House, we reach the Societat or club-house, and most of the residences of the Europeans. For this place, like all Dutch cities in the East, is divided into *kampongs* or quarters, the southern being occupied by the Europeans, and the northern by Chinese and Arabs. Continuing our walk, we pass an old fort built by the Portuguese in 1607, in an open space facing the beach, and beyond this the native town extends for about a mile to the north-east. The road leads to the palace of the Sultan of Ternate, now an untidy, half ruinous building in the European style, prettily situated on a broad terrace facing a wide and beautiful lawn reaching to the sea-shore. Its present occupant is old and bed-ridden; he is allowed a small

annual pension by the Dutch Government, and permitted to exercise a semi-sovereignty over the native population of this island and the northern part of Gilolo. One day during our stay here was seen a procession of six large canoes gaily decorated with flags and laden with fruit, their crews singing merrily to the noise of the tom-tom and bamboo drum. I learned that the canoes contained the three-monthly tribute from the adjoining villages to the native sultan. What a change these native rulers have experienced, each succeeding prince finding his revenue diminishing, his authority lessened, and his territory slipping away. And yet their forefathers were powerful men, living in great state, and owners of immense riches, the proceeds of the spice plantations; but they are all now reduced to a state of vassalage, and are but regal slaves, whose pomp and state are maintained by the dollars of the Dutch.

The villages close at hand consist of a number of bamboo-built houses, nicely sheltered with cocoa-nut and banana trees, picturesquely situated on a little projecting point, almost surrounded by the bright blue sea.

On my way back to the European quarter, I walked along the shore. Before me lay the island of Tidore; the departing sun was sinking behind the high jagged peak, and his last golden and purple rays seemed to waver as they shot over the glassy surface of the bay; and the broad, deeply fringed leaves of the cocoa-nut palm on the beach took a deeper and richer hue in the glowing sunlight. Then a dull heavy booming sound echoed from a large Mohammedan mosque picturesquely situated close at hand. This, I found out, was the low rolling of the drum summoning the faithful to assemble and return thanks to the Prophet at the close of the departing day. I went into the building, which is a square, pagoda-like structure with several roofs, one above the other, and each being a little smaller than the one beneath it. A wall surrounds the building, inside which was a large well, or pool, where all the faithful performed their ablutions before proceeding into the sanctuary. After getting within the inclosure, an inclined terrace of steps led to the entrance door, where boots had to be removed, and I entered barefooted the sacred precincts amongst the worshippers, who were kneeling in front of a recess or niche, and a gaily painted and decorated dais or throne; but I could learn nothing as to the objects in view, and the whole of the religious ceremony appeared to consist of the repetition of a certain number of prayers or passages from the Koran, on the termination of which all seemed to disperse highly pleased.

Several of our party, one evening just before sunset, started off for a walk to the top of the volcano situated at the back of the village; they were provided with an introductory letter to a planter, living high up the mountain-side. A couple of hours' hard walking brought them to the house of mine host, who hospitably entertained them for the night. Before sunrise they started the next morning, reaching the crater all right; the height was found, by barometer, to be over 5000 feet above sea-level. Height of barometer on board the ship $29^{\circ} 95'$, at the top of the mountain $24^{\circ} 67'$; temperature of air at top 68.5° , at sea-level, 84° .

* Before we left Ternate, the resident made up a party for the purpose of visiting the spice plantations. Landing at an early hour, we found a walk through the charming avenues most enjoyable. The whole surface of the land is covered with various kinds of stately trees, interspersed here and there with neat little inclosures and huts of the natives. It must be remembered that we were in the Tropics, where the wild luxuriance of nature runs riot, for the natural vegetation of the hedges and hill-sides overpowers in picturesque effect all the artificial productions of man. Wending our way along paths where the line of vision is very limited from the dense foliage, we occasionally got, on reaching a clearing, alternate peeps into wooded valleys and fertile plains, and glimpses of the bright blue sea beyond, backed by hills and bordered with low wooded shores, on the surface of which were numerous coasting-vessels, boats, and canoes, the white sails looking bright in the morning sun. Still continuing our walk along shady pathways, and admiring each successive view, we reached the plantations. Delight itself, however, would be but a weak term to express the feelings even of the most ordinary observer of nature here. The lovely sago-palm, with its great bunches of fruit; the fascinating betel-nut, tall and tapering; the luxuriant profusion of pepper, cinnamon, cocoa, nutmeg, and clove trees, with numberless others producing durians, mangustans, lansets, and mangoes, the wide-spreading branches and bright green foliage are fitted to the hand of industry for fulfilling the varied purposes of life, whether useful or ornamental—all gave to the general aspect a picturesque beauty only to be met with amongst these lovely islands.

It was soon time to retrace our steps, yet I could not help stopping again and again to gaze on these scenes, and to endeavour to fix on my mind an impression which at the time I knew I should wholly or partially lose. The form of the beautiful nutmeg fruit and other spice-producing trees, the sago-palm, or betel, may possibly remain clear and separate, but the thousand and one

beauties that unite them into a perfect scene, must surely fade away.

It was past noon when we again reached Government House; and now each of our party strolled away, either to the club or for a farther walk in the country, so as to pass the time until the evening, when a reception in honour of the "Challengers" was held at Government House, finishing up with a ball.

All the rank and beauty of Ternate were of course there to meet us, besides the officers from a small Dutch war-ship in port. The company was a medley of nationalities. There were Arabs in jaunty turbans and long, flowing bernouses; curious-looking Chinese in silks and long tails; Malays with close-shaven crowns and richly brocaded jackets; and sober, quiet-looking Dutchmen in evening dress. Nor must I omit to mention the one resident Englishman (Mr. Edwards) and his family. The ladies were, with few exceptions, all Mestizos, got up in silks and muslins, and looking their best. The *Challenger's* band attended, but the company preferred dancing to their own plaintive tunes, produced from a fife and a couple of fiddles. Thus pleasantly passed a few hours; and from the kind consideration and hospitality of our host and hostess, memories will long remain of the ball at Ternate.



NATIVES OF THE PHILIPPINE ISLANDS.

CHAPTER XI.

TERNATE (MOLUCCA ISLANDS) TO SAMBOANGAN, ILOILO, AND MANILLA
(PHILIPPINE ISLANDS), AND TO HONG KONG (CHINA).

Leave Ternate—Birds of paradise obtained—Early history of the Moluccas—Mindanao, Philippine Islands in sight—Anchor off Samboangan—The village—Hospitality of the Spanish officials—Dance of the Malagahi Indians—Leave Mindanao, and anchor off Panay—The town of Iloilo—Visit Jaro—The ball—Leave for Luzon—Anchor in Manilla harbour—The city—Cigar factories, &c.—Leave Manilla—Passage to Hong Kong, China—Arrive and anchor in Hong Kong harbour—The city—Its residents, shops, theatres—Their temples and religion—Joss, the mystery—Captain Nares leaves for England to take the Arctic command—Loss to the expedition by his leaving—Arrival of the English mail.

On Saturday morning, October 17, after a last "chin-chin" with the resident, and a last bargain for birds, the ship left for Tidore,

with the most pleasant recollection of a two days' stay at Ternate, and a full appreciation of the kindness and *bonhomie* of his Excellency. I may just remark here that history informs us that the first people known to have left their homes to trade down here are the Chinese; then came the Arabs and their religion (as far back as 1300), then the Portuguese with the Cross and the oppression carried on under its sanction. (Magellan's ship anchored in 1521 within a mile or two of our moorings.) After these came the Dutch, who expelled the Portuguese in 1605, and seem to have been more tolerant than their predecessors. For a long time the native princes required to be dealt with most cautiously, until one after another gave up his right to grow spice, accepting a subsidy in its place, and the Dutch held the monopoly for years, to be eventually by them given up for a more enlightened policy.

During all these changes—and I have not mentioned the temporary occupation of the Dutch possessions by the English—one hears nothing of the natives, and yet they sent forth that scourge of the Eastern seas, the Malay pirates, and on one occasion actually challenged the Dutch to come out and fight them. But it has all passed now, and with rulers daily becoming the tools of the Europeans and adopting a burlesque of civilised life, the natives seem to have fallen away, and to-day I fail to distinguish them from the mass of working people who have, as it were, absorbed the population of the sea coast.

The following may be mentioned as amongst some of the varieties of birds of paradise obtained here:—

1. The great bird of paradise (*Paradisea apoda*) is the bird usually seen in England. It is the same as that called by Williams *apoda*, or "footless," from the fact that all the skins sent home at first were without feet. It is confined to the Arru Islands.

2. The lesser bird of paradise (*Paradisea Papuana*) is the commonest and to me the most handsome; it is found in New Guinea and the adjacent islands.

3. The red bird of paradise (*Paradisea rubra*) is a handsome-looking object. It is confined to Wargon, an island of the north-west extremity of New Guinea.

4. The king-bird of paradise (*Cinnurus regius*) is much smaller than the others, and is a brilliant red, the plumage being velvety to the touch and eye. The decorations consist in two wire-like tail feathers, terminating in a beautiful green circle, and in two metallic green tufts which it throws out on the wing. The king-bird is rare in Europe. It is found in Mysol, New Guinea, and the Arru Islands.

5. The magnificent bird of paradise (*Diphychodes speciosa*) does not

to me deserve the name it bears ; still it is a very beautiful bird ; the yellow feathers are thrown up as a ruff. It is the rarest of all in Europe, and is confined to Mysol and the mainland of New Guinea.

6. The twelve-wired bird of paradise (*Seleucides alba*) is to me the perfection of plumage. It is very rare and scarce, and proportionately expensive at Ternate. It is found at Solwatty and the north-west of New Guinea.

7. The scale-breasted bird of paradise (*Ptilus magnifica*), altered to the rifle-bird of Australia, and more like a gigantic humming-bird. It is the size of a pigeon, and a very handsome green. Found on the mainland of New Guinea.

We were fortunate in having a glimpse of all these and some half-dozen other species in the collection belonging to the resident. But it was by an ex-Dutch naval officer, a Mr. Bruijn, that the greatest treat was afforded us. He had married the daughter of a native of Ternate of an ancient Dutch family, and so had settled here, where he possessed a nice plantation on the outskirts of the town. Here we saw the lesser (*Papuana*) and red (*rubra*) birds of paradise alive, and beautiful-looking objects they were.

In his spare time Mr. Bruijn has taken to natural history, and has two or three schooners employed, visiting the eastern islands and New Guinea for all kinds of birds, for tortoise-shell, *bêche de mer*, and pearls. He has great boxes full of skins of all kinds that his hunters obtain for him. Before our leaving, the Professor enriched the collection on board by a purchase of £100 worth of birds' skins from him, including thirteen varieties of the bird of paradise.

Steaming on with charming weather across the Molucca passage, the idea of visiting Tidore was given up on our nearing it, and we passed on into the Celebes Sea. The scenery in every direction was very lovely, the lofty high volcanic land affording more than ordinary interest, as we occasionally stopped off the steep shores for trawling.

One of our soundings gave 2250 fathoms ; the temperature of the water at 700 fathoms was 38°, and continued the same heat to the bottom. The trawl from that depth was good, although there was nothing actually new. There were several fish similar to those obtained before in the Atlantic. The heat of the surface water was found to be 86°, the highest that has been registered for the cruise. Some fine live forameniferous shells were caught in the surface tow-net.

Let me add a few words on the Moluccas, which we are now leaving. The name *maluca* is an Arab word, signifying "the kingdom" *par excellence*. The Moors established themselves there

between 1450 and 1470, conquered the greater part of Gilolo, and founded on that island two Moorish sovereignties. It is pretty certain that the Chinese and Japanese were in the habit of trading to the Moluccas long before the arrival of any Western nation.

Francisco Serrano, a Portuguese, was the discoverer and first European commander of Ternate. The exact date of the discovery is not certain, but in 1521 Magellan's fleet, then under the command of Espinosa (Magellan had been killed at Mactan just before), anchored off Tidore. From this date frequent visits were made both by Spaniards and Portuguese, resulting in a series of petty wars and disputes.

In 1470, we find, Sir Francis Drake, in his voyages round the world, visited Ternate, where he was favourably received by the then reigning sultan.

The enterprising Dutch now appear on the scene, about 1559. In this fleet was Will Adams, an Englishman, who acted as pilot, and who afterwards proved to be the first Englishman who visited Japan. The Dutch obtained a firm footing, established a factory, and in 1602 the first charter for twenty-one years was granted to the Dutch East India Company. They met with strong opposition both from the Spaniards and Portuguese, and after several engagements the Dutch were victorious, and the Spice Islands remained in their possession for over 150 years.* In 1796 an English expedition captured Amboyna and Banda, but the islands were again ceded to the Dutch by the Treaty of Amiens in 1802, together with Ternate, which had been taken by capitulation in 1801. In 1810 all the islands were again captured by the British. The taking of Banda and the fall of Ternate, both after one day's attack, are especially noteworthy, whilst at Amboyna good seamanship and a ruse under sail enabled a capture of the strongly fortified place to be made with the trifling loss of two men.

Steaming away north through a passage near Celebes between the islands of Bejaren and Banka, we sighted a mass of splendid volcanic islands of great height, some of them in an active state. On the 23rd the high land of Mindanao, covered with bright green foliage to the very top, was before us. Stopping frequently for soundings, it was late in the evening when we anchored off the village of Zamboanga or Samboangan, on the southern part of the large island of Mindanao.

* An account of the exploits will be found in James's 'Naval History, except the second capture of Ternate, which only appears in Norris' 'Gazetteer,' and the story of the history of the Moluccas, from Burney's 'Voyages.'

The next day, early in the morning, as the sun rose, the picture from the deck was very beautiful. The little village before us was almost concealed from view by the varied foliage stretching from end to end, backed by high land cultivated nearly to the summit, while in the fertile plains below the waving palms and bright green stalks of the rice stood out in pleasing relief.

As is usually the case on landing at these villages, Samboangan lost much of the charm apparent from the anchorage. I found we had altered not indeed the character of the scenery, for we were still amongst the lofty richly wooded hills and volcanoes, and from time to time saw the grotesque-looking native prahs skimming over the surface of the bay, but the people and their houses had changed much. The neat cleanly dwellings of the Mohammedan Arabs and the bungalows of the Dutch were succeeded by the more pretentious and less clean houses of the Spaniards with a ground floor of dirt and refuse and a second story alone inhabited or cared for. The habits, too, of the nation were indicated by an outside display of flagstuffs and oil lamps.

Through the middle of the town ran a stream, and it was curious to see the great use made of its waters. Half the population seemed bathing or washing their linen at 10 A.M. The faces of the women were generally prettier than we had seen for some time, and the long, glossy black hair flowing down the back of some of the younger ones did not detract from their beauty if such a word is applicable. The Plaza was of course to be seen; in what Spanish village is it not? and the church with its convent annexed was well ventilated and not unsuitably decorated. The first thing to be done, seeing that our only medium was English gold and silver, was to establish an exchange, and after much discussion with a Chinaman, and many weighings and examinations of the sovereigns, it was at last decided on five dollars to the pound sterling. Visits of ceremony were made to the governor and the senior naval officer—a jolly English-looking fellow—who at once put his quarters at our disposal.

A Spanish surveying vessel, the *Vad Raz*, was in port last from Singapore, and a cordial interchange of courtesy and good feeling took place. She had been employed in blockading the Gulu coast, and had captured more than one hundred and twenty prahs, pirates her commander called them.

In the afternoon we took a walk along the broad outskirts of the town into the country. We found the roadside prettily decorated with thick and many-tinted foliage, tall bamboo shaking their feathery heads aloft, the cocoa-nut still loftier, palms of various sorts; the

plantains and bananas, the huge green leaves of which give such richness to a tropical landscape, and the many-coloured bright flowers and tralliers hanging over banks of rivers that flow into the sea. Those of our party who went further inland on horseback brought back glowing accounts of the hills and their scenery. The natives met with, it being Sunday, were dressed in their best, and some of them wore smocks and handkerchiefs of pina richly embroidered. It looked strange to see men wearing their shirt over all, befigured like a shawl, and almost transparent.

The only approach to a café in the place was a shop kept by Dom Francisco Spalding, an English subject, but who spoke not a word of his mother tongue. He was very obliging and sold capital beer (Bass's and Allsopp's) at 2s. the quart bottle. His shop was the rendezvous and gossiping place after the heat of the day.

With the proverbial kindness and courtesy of the Spanish officials, a pleasing entertainment was arranged for us during the only evening of our stay. On landing it was found that the upper room of the large house of the captain of the port had been prepared for the occasion, and was pretty well filled with a number of Moros Indians from Malagahi (the hill tribes), who were busily preparing to give us a national dance. The musicians were mostly women, who played with drum-sticks on gongs of various sizes, arranged in sets of ten or twelve in number, and on instruments formed of long metallic bars and strips of bamboo on strings stretched across frames, besides flutes, drums, and a curious two-stringed fiddle. The variety of sounds produced was both harmonious and pleasing. When all was ready, at a given signal, the dancers sprang to their feet, and soon we had a sight not easily forgotten.

The performers, principally girls, were dressed in bright and gorgeous costumes, in silk, satin, and gold embroidery, with rings, armlets, and jewellery. Their pleasing and easy motion, the graceful attitudes and movements of their body and arms, had a novel effect, and on its conclusion we could be no other than highly pleased with the treat. There was a large attendance of Spanish officials, both of the navy and army, who did their utmost in providing many good things for our enjoyment and comfort.

Being anxious to push on so as to reach Hong Kong before the change of the Monsoons, early the next morning we were under weigh, steaming through the Sulu Seas. We stopped for a few hours, and obtained soundings in 2500 fathoms, with a peculiarity of temperature, which was found to be 50° at 400 fathoms, and the same through the strata of lower water to the bottom. We were, said

the theorists, in a mass of water hemmed in (as in the Mediterranean) by submarine land at a depth of 400 fathoms.

On the afternoon of the 28th October the anchorage off the town of Iloilo, in the island of Panay, was reached. The approach to the port is by a narrow channel between a sandbank and the island of Guimaras. The place looked unpromising enough, flat muddy swampy ground, with every appearance of an unhealthy situation for a town. A dilapidated Spanish fort, and the forlorn look of a lot of Malay houses built on piles in the mud, helped to strengthen one's first ideas.

Landing on the beach, we met two Englishmen, from whom it was ascertained that the English vice-consul was at present in England, and that his successor was ill with fever, that the child of one of the few Europeans had died that day, and that the English doctor had succumbed to fever a short time previously; and yet these men, and all the other English merchants we afterwards met, reiterated their assertion that the place was healthy.

Iloilo, as a place of commerce—and to-day it has comparatively a large trade—was almost founded by Nicholas Loney, of Plymouth, Devon, a surgeon by profession, who was subsequently joined by his brother in founding the house of Loney & Co., the largest business firm in the place, trading in sugar, hemp, &c.

A party was made during our stay to visit Jaro, where a weekly market was being held. The road to the place, a distance of 3 miles, was abominable. At Jaro, where we stopped at the house of a Mestizo called Señor Theodore to examine and purchase pina (for which this province is particularly famous), I should be sorry to say the amount of money spent in this article. The market and different types and costumes of its frequenters were worth visiting, and here again additional purchases of pina direct from the interior was made.

Señor Theodore lived in a very large house, built, *à l'espagnol*, with a ground-floor occupied by poultry, buffaloes as beasts of burden, horses, and dirt. His reception room was of enormous size, and admirably arranged for ventilation, as indeed was the whole of the suite of upstairs rooms. Breakfast was provided for us, the host presiding, dressed in white trousers, with an embroidered pina shirt over and outside all, whilst his wife and daughter were relatively in the same costume; and yet this man is the largest real estate proprietor in the Philippines, owning fifteen large estates, and reputed to be worth nearly a quarter of a million sterling. He and his family bargained personally, and did it well, for his goods.

From Jaro our ponies were taxed to drag us to Molo, a distance of

2 miles, to the house of a Mestizo, where we saw several looms at work making pina and embroidering the gauze whilst weaving it; some of the coloured patterns, the colours being silk, were neat, and had evidently been copied from European originals.

On returning to the vessel in the evening, we found a shooting party had been away all day to the island of Guimaras, which was said to be full of game, and the rivers swarming with crocodiles. But they were unsuccessful, and saw neither. Another party who went to a smaller island were equally so, only bringing back a few small birds as specimens.

Before leaving, a ball given by the European residents in honour of our visit was announced, at the house of our friend yesterday at Jaro, and a strong muster took place. As there were only three or four "white ladies" in the place, the remainder of the gentle sex—"fairer" is not applicable—were Mestizos. Their dancing was certainly admirable, but all our attempts to do the agreeable with the native ladies usually ended in failure. Their dresses were necessarily thin, though doubtless very expensive, the short jacket and only upper garment being over all. Their figures were not at all graceful. Some of these ladies were noticed to have changed their dresses three times during the evening.

The men were dressed as usual, with the white trousers and embroidered shirt over all; and a remarkably nice and cool dress it is in a ball-room where it is unusually hot and stuffy. It was long past midnight before we said our *adios*. A charming drive back in the bright moonlight; the ship was reached about 2 p.m., and by sunrise we weighed anchor, and were steaming on for Manilla, threading our way through the Strait of Iliolo, anchoring late in the evening at the north of Panay, where an attempt was made to dredge up specimens of the euplectella, the silicious sponge of the Philippine Islands, but after several trials we were unsuccessful. Early the following morning we were again on our way steaming through the Straits of San Bernardino, where three centuries ago the Spaniards, the Dutch, and Portuguese commenced to work out the great problem of civilisation.

On the 4th November we sighted the lighthouse at the entrance of the magnificent harbour of Manilla, and some hours' steaming brought us to the anchorage, at a distance of a couple of miles from the city. Looking towards the shore, we saw ramparts stretching along the low coast, with roofs, domes, and spires rising behind, while far away in the hazy distance could be seen the faint outline of a mountainous range.

Soon after we were visited by the various officials, and oppor-

tunities were given for landing. The business portion of the city is prettily laid out with numbers of long and handsome streets, extensive stores and warehouses, which afford employment to hundreds of coolies and others, who are seen rushing about with bales and packages, loading or unloading vessels in the river. Among the interesting sights of Manilla are the cigar factories. There was no difficulty in obtaining a permit from the chief of the administration to see them. We were informed that in the one visited four thousand women and half that number of men are employed, while in the neighbourhood as many as nine thousand women and seven thousand men find employment in producing cigars. As we entered the building, our ears were almost deafened by the chattering and noise made by some hundreds of women seated on the floors, each provided with a small wooden mallet, with which she hammered the tobacco leaves on blocks to polish them for the outside of the cigars. In other rooms they were employed in rolling them up into their proper shape, finishing off, and otherwise preparing them for the market.

Tobacco being a strict monopoly of the government, it is entirely in charge of a military administration, and during the harvest, we were informed by the officials who accompanied us, the greatest care and supervision are necessary to prevent the best leaves of the crop being carried off by the employés. After the gathering in from the plantations, the leaves are first placed in heaps under cover to ferment, then sorted according to size and quality and allowed to dry, finally reaching the manufactory, where they are made into cigars as we saw them.

The city is situated in a rich and fertile district, in the midst of magnificent scenery, splendid alike in form and colour, but, like every town in these islands, has one great enemy to dread—earthquake, which has from time to time made frightful ravages in this city, evidences of which are seen at the present time in the ruins of churches, cathedrals, and public buildings.

On the 11th November our visit came to an end, and we proceeded out of the harbour under steam. Before clearing the land, we had all the prospects of a rough passage before us. At the best of times the China Seas are anything but calm, but now we had the full force of the Monsoon against us; and the wild cross waves breaking on our bows tossed us about with great violence, to the destruction of crockery and furniture, until nearing the coast, when it moderated sufficiently for us to have a few hauls with the trawl with satisfactory results. The 16th November, Victoria Peak (Hong Kong) was seen, and a few hours later we were threading our way through a

very maze of boats and shipping until reaching the anchorage off the naval yard. Soon we were surrounded by a host of sampans and junks, whose noisy occupants were each seeking the honour of being appointed the *Challenger's* bumboat.

Few places are more interesting to the traveller from Europe than this city, furnishing as it does such a change of scenery, manners, and customs, so widely different from anything he has probably seen before.

The harbour is crowded with men-of-war and trading vessels of many nationalities, while hundreds of junks, sampans, and fishing-boats, full of life and movement, contribute to make the scene one of great attraction. Not more than half a century has elapsed since England took possession of this island, at which time it was little less than a bare uninviting rock, the haunt and home of pirates and desperadoes, who were the terror of these seas. What a change has been brought about in this brief period! Now it is a great centre of trade and commerce, and vessels come from Bombay, Calcutta, and Singapore, laden with the choicest products from these lands for trans-shipment to England, America, or our colonial possessions, receiving in return tribute from those distant countries, in exchange for teas, silk, opium, and other requirements. It is already one of the most flourishing of our colonies in the East, and destined to still further extension and greater importance. It has become the postal terminus of the many lines of mail-steamers that arrive weekly from Europe and America, and now, with submarine telegraph, is in instant communication with every place of importance.

Victoria, the chief town, is situated along the northern shore of the island, with its magnificent harbour stretching out in front, and backed up with mountainous land, culminating in Peak Victoria, 1200 feet above the level of the sea, and stretching along the length and breadth of the city, shutting out the invigorating breeze for half the year, and causing it to be one of the most unhealthy of our colonial possessions. It is laid out with fine streets, and its hill-side is crowded with villa residences of the wealthy traders and merchants.

The Chinese population, who are ever alive when an opening occurs for trade, have come here in swarms from the mainland, and made this once almost barren rock their home, building a town of their own, which skirts the bay and scrambles upward and onward over the hill behind.

The cathedral, government house, clubs, and public buildings are splendid specimens of architecture, and thus exemplify the

energy and industry of the Anglo-Saxon race. What other race would think of placing house and home in such a locality? The summers are usually hot, and the town unhealthy; still manifold precautions and sanitary measures have done much of late to diminish the amount of sickness. As it is, however, great numbers are invalided home from the vessels employed on this station, while others find rest in six feet of earth in the Happy Valley, where a Protestant cemetery is situated.

Warehouses and stores, for supplying every requisite and luxury of life, are numerous. The houses of business along the Queen's Road would do credit to many a European town, and the naval yard is complete with every requirement for refitting vessels employed on this part of the station.

On reaching the shore, a walk through the Chinese quarter is most interesting. The houses and shops are most curiously constructed, and just as strangely fitted up; not one, however small or poor, but has its domestic altar, its Joss, and other quaint and curious arrangements known only to these peculiarly strange people. Look where we will, there are evidences of the untiring industry and enterprise of these surprising sons of Shem. Up every alley, and in every street, we see crowds of little yellow faces, and stumble against the brokers or merchants hurrying on to their business, clad in the universal blue jean jumper and trousers, cotton socks, and shoes of worked silk, with thick wooden soles; some with, and others without hats; the shaven face and pigtail so typifying the class that to note a difference between Sun Shing or Wang Heng is sometimes most embarrassing. The dress of the women differs but little from that of the men. The curious, built-up style the married ladies have of wearing their hair gives them a strange appearance; while the younger lasses allow theirs to hang down their back in tresses, or wear it bound tightly over their foreheads, and secured *au chignon*. Their cheeks are tinted bright pink, and with their neat little feet, and clean and loose clothing, they make a very pretty picture. Although great numbers of other nationalities are to be seen, the Chinese are most conspicuous and interesting to the stranger; and, when once the business of the day has begun, the din and traffic are enormous; for crowds of men, of all creeds and colours, Jew, pagan, and Christian, Buddhist and Parsee, Chinese, Japanese, and European, fill the streets, while gangs of coolies chant to keep step, as they press on beneath their heavy burdens. The merchants, whose places of business lie along the Queen's Road, are so similar in appearance that a description of one will apply to all. He is generally a fat, round-faced man, with

an important and business-like look, wearing the same style of clothing as the meanest coolie (but of finer material), and is always clean and neat, his long tail, tipped with red or blue silk, hanging down to his heels.

The Chinese never depart in the least from their national dress, which indeed, is impossible to improve on for a tropical climate, whether as regards comfort or appearance. The loosely hanging trousers and neat white half-shirt half-jacket are exactly what a dress should be in these latitudes.

Continuing our walk along the Queen's Road, hundreds of small shops are passed, where are seen the most marvellous and miscellaneous collection of "curios" possible. The shopkeepers are, as a rule, very good-natured, and will show one everything they have, not appearing to care much whether a purchase is made or not.

They always ask for their goods about twice as much as they are willing to take. If you buy a few things from them, they will invariably speak to you afterwards every time you pass the shop, asking you to walk in and sit down to rest, or to take a cup of tea or some chow-chow; and you wonder how they manage to get a living where so many sell the same kind of article.

Farther on are to be seen carpenters busy at packing-cases, cabinet-makers hammering away at camphor-wood chests, brass-workers clattering away making bowls or gongs; while at every step are met sellers of water, vegetables, fish, soup, fruit, &c., with as many cries, and just as unintelligible, as those of London. Others carry a portable cooking apparatus on a pole, balanced by a table at the other end, and serve up a meal of shell-fish, rice, and vegetables for a few cash; while coolies, boatmen, and others, waiting to be hired, are to be found everywhere.

Here are dentists, letter-writers, fortune-tellers, and hawkers of odds and ends, on every side, while the barbers have plenty to do shaving heads and cleaning ears; water-carriers, bearers of sedan-chairs, coming and going in all directions, dressed in their peculiar national costume, with their long tails either wound about their heads or trailing down behind. The streets of Hong Kong offer a thousand reflections to those who have never before been brought in contact with the celestial race.

The restaurants, grog-shops, tea-houses, and gambling saloons are very numerous, and under strict surveillance of the police; but what usually at first arrests the attention of the stranger are the numerous little niches along the street sacred to Joss, where at certain hours are burnt strips of coloured paper and scented sticks, for some mysterious rite known only to these strange people. To see them

at their chow-chow is of itself a treat, for it is all done openly in their shops, which have no glass fronts to them, as we are accustomed to see in most European cities. They have the character of being most patient in poverty, and if ill-luck befalls them, they will live on rice alone and suffer without murmuring. A disorderly Chinaman is rare, and a lazy one scarcely exists; so long as he has strength to use his hands, he needs no support from anybody. Europeans often complain of want of work, but a Chinaman never does; he always manages to find something to do; consequently, beggars are but seldom met with amongst them.

All Chinamen can read, write, and cipher with facility. It is a curious sight to see book-keepers in the stores tallying up their accounts on a machine like a gridiron, with buttons strung on its bars, the different rows representing units, tens, hundreds, and thousands. With all the shopkeepers the value of the slightest article purchased is calculated in this way in dollars and cents with great rapidity. The studs are pushed about from place to place as fast as a musical performer's fingers travel over the keys of a piano.

The theatres, or (as they English it) the sing-song houses, are amongst their principal amusements, and exhibit the peculiar traits and character of the people. Being possessed of a language which may be termed the very music of speech, from its capabilities of modulation, great things might be expected; but the vocal music seemed to us of an extraordinary character, little resembling any description of sounds with which we were at all familiar. Pitched in the highest falsetto tone, the voice of the singer flies from note to note in the most singular manner, producing a very unearthly noise, which has no relation to any conceivable progression of human sounds. Nor is their instrumental accompaniment any better. The musicians are on the same stage with the actors, with gongs, horns, and cymbals. Melody there is none. They blow and beat, and beat and blow, varying the monotony of the sound by frequent and successive crashes. The plot of the drama, whether tragedy or comedy, it is impossible to understand. It seems to have no proper beginning or end, but to go on from day to day in a succession of battles and love-makings, until the patience of the audience is exhausted.

After leaving the theatre, we reach the native quarter, and entering "Curio" Street, the first thing to arrest our attention is the busy, untiring industry of the Chinese in their little shops, where sandal-wood boxes, ivory turning and carvings, lacquer-ware, tortoise-shell and bronze goods, silks and embroidery are laid out in tempting array.

Continuing on through long lengths of streets, we pass corn and rice mills, dye-houses, blacksmiths', carpenters', umbrella and lantern makers', bootmakers', tailors', and barbers' shops, with gaudy swinging sign-boards—the several characters noting the name and style of the firm.

Some of the narrowest parts of the road we find quite a difficulty in passing, from the crowds of purchasers and vendors of fish and pork and vegetables and endless other articles of food, whose stalls and tables occupy the side walks in front of the shops. Jostling on amongst this busy scene, we hear the constant "Ah ho!" of the palankeen-bearer, causing us fresh confusion at every step. At length we turn down a small side-street, where are gambling-houses, money-changers, Joss temples, samshu and sing-song houses, from which are heard the screaming of song and the twanging of the stringed lute.

We enter a temple, whose outside is adorned with gilding and lacquer, and quaint designs of birds, animals, and unreal monsters.

They have a religion of some sort, as Wang Heng (a very intelligent Chinese with whom I was acquainted) assured me, with churches and endowments as in England; that is to say, they have the system, but not the faith. I had supposed all along that the curiously constructed temples, sacred to Joss, had more or less of a religious character about them, but I was now undeceived. My habit on passing these edifices was to call in and see what was going on, and one day I found out that Joss was nothing more than a fortune-teller, after the manner of the Oracle of Delphos.

When inside the temple, we see the figure of Joss placed on high, with ornaments of peacocks' feathers, whilst long streamers of coloured ribbon, pictures, and flowers, presents of tea, oil, or opium, lighted tapers in coloured wax, joss sticks burning slowly, and sending their perfume around, heaps of joss paper smouldering in trays, bamboo boxes, with bundles of small sticks, on the end of which are inscribed certain cabalistic characters, surround the figure. At certain hours in the morning the temple becomes sacred. It is the hour of divination. Any one now about to undertake a journey or make a purchase, and desirous of knowing if he will arrive in safety or make a profitable investment, comes to Joss. He pays his obeisance by profoundly bowing and salaaming, then lights a certain number of matches or tapers, and makes a present; after a while, when it is thought Joss is conciliated, the suppliant takes the box of marked sticks, and, after shaking them about, selects half-a-dozen and passes them to the priest, or Sheong-ti (son of heaven), in attendance, who refers to the book of mysteries, and there reads the

will of Joss. If he is warned of misfortune, he forbears the journey, or declines the bargain, and waits for a more fortunate day. If Joss advises otherwise, and a good profit is the result, the happy merchant makes a substantial present. Joss is therefore (as will be seen) a fortune-teller, and nothing more, and Sheong-ti is only a sensible cunning fellow, who prefers to live by the credulity of his neighbour rather than by the labour of his hands.

Buddhist temples literally swarm over China. The officiating priests are consequently very numerous. The gods they worship are the three precious Buddhas—the past, present, and future. These images are usually of gilded wood, represented half naked, with woolly hair, in a sitting position; one holding the mundane egg in its lap, one adorned with the sacred thread, and one engaged with its finger upraised, as though instructing mankind.

In front of these three images are usually three smaller ones, representing the goddess of mercy, the god of war, and one described as the protectress of seamen. A high table for candles and incense stands before these images, and in the centre of the building is a large metal caldron for burning coloured paper, while near at hand are the great bell and drum which are sounded to arouse the attention of the god when any important persons arrive; these things, with a few cushions and mats on which the worshippers kneel, make up the furniture of a Buddhist temple.

These people have no Sabbaths, nor periodical seasons of rest; the only cessation from their daily toil is the Feast of the New Year, when they generally have a week's holiday.

During our stay at Hong Kong, much to the regret of every one on board, Captain G. S. Nares received an appointment from the Admiralty, as commander of an Arctic Expedition, fitting out in England. He left Hong Kong on the 10th December by the homeward bound mail steamer, accompanied by Lieut. Aldrich, taking all our hearty good wishes; "and may God bless him and his endeavours," we all fervently echo.

It seemed like the beginning of the end, and was a great blow to us all, for the Captain had gained the full confidence and regard of those who were associated with him, and it was considered by all hands a most unfortunate event that he should be removed from the head of our expedition, which had hitherto worked so well, and produced such valuable results, under his direction.

His many good qualities had been so thoroughly tested during the past two years, that it had endeared him to each and all, both as chief of the expedition and as a private friend.

Still we could not help recognising the importance of the selection

by the Admiralty of one of his experience to command the proposed Arctic Expedition, which will have the best possible chance of coming to a successful issue under his guidance.

There were not two opinions as to the most fit officer in China to succeed to the command of the *Challenger*, and luckily the right one was selected by the home authorities in Captain Frank T. Thomson of H.M.S. *Modeste*; popular as a Mate, Lieutenant and Commander, he has retained his reputation as a Captain, and was therefore able thoroughly to fill the void caused by the departure of our late chief.

And all we have now to hope is that the remainder of the cruise will go on as successfully as it has hitherto done.*

Lieut. Aldrich's place was filled by Lieut. Alfred Carpenter, who had been serving on the China station in H.M.S. *Iron Duke*.

We had now been some seven weeks at Hong Kong. The mail from England is in, after some grumbling at being a few days late, for now, if the signal gun does not announce its arrival within the forty-two days, everybody begins murmuring and complaining—fewer days nearly than a century ago it required weeks.

* Our hopes were more than fulfilled; everything under Captain Thomson's direction was a success, and he soon endeared himself to those with whom he was brought in contact, and all felt considerable regret when the time came to separate at the close of the commission.



INDIAN VILLAGE ON THE BANKS OF THE RIVER PASIG, MANILLA.

CHAPTER XII.

HONG KONG (CHINA) TO MANILLA, ZEBU, CAMIGUIN, AND SAMBOANGAN
(PHILIPPINE ISLANDS), AND TO HUMBOLDT BAY (NEW GUINEA).

Leave Hong Kong—Passage to Manilla—Sight a derelict—Tow her into Manilla—Scenery on the road and river—Leave Manilla—Passage through San Bernadino Straits—Numerous islands in sight—Arrive at Zebu—The town—Dredging for euplectellas off the island of Mactan—Our success—Leave Zebu—Passage to Camiguin—The new volcano—Its effect on the surrounding country—Anchor off the village of Abajo—Proceed along the west coast—Anchor off Samboangan—The scenery—Visit the island of Basilan—Get a supply of coal—Leave Mindanao—Natives of Philippine Islands—A course shaped for Greenwich Island—New route to and from Australia to China—Unfavourable weather—Sounding and dredging—Cross the Equator (third time)—Course altered for New Guinea—Land in sight—The scenery and prospects of exploration—Anchor in Humboldt Bay, New Guinea.

On the morning of January 6 all was ready, and after receiving a great number of visitors, all bidding us good-bye and a pleasant cruise, at noon a move was made from the anchorage, the bands in

the various vessels playing the farewell tunes, for there were a goodly number in port of English, French, Russian, Austrian, and Prussian nationalities.

And now farewell to China, as we steamed out through the Lye-moon Pass, and long before nightfall the long, low coast was out of sight.

The passage from Hong Kong to Manilla was, as is usual at this time of the year, a most disagreeable one. On the morning of the 8th January the wind fell somewhat, and soundings were obtained, showing a depth of 2100 fathoms, with a bottom of pale grey ooze. A series of temperatures was taken at intervals of 50 fathoms down to 400 fathoms, and 100 fathoms down to 1000 fathoms.

This station was just about the middle of the China Sea, so that the serial observations were somewhat interesting. At 900 fathoms the temperature was 36° Fahr., and this was maintained to the bottom; so that the layer of water 1200 fathoms in thickness, at a uniform temperature of 36°, occupies the basin of the China Sea. From these results I believe the conclusion arrived at was that this sea is cut off by a barrier, which rises to a height of between 800 and 900 fathoms below the surface, and so is prevented from communicating with the Antarctic basin.

On the morning of the 10th the weather had moderated, when a vessel apparently in distress was observed on the horizon. Our course was altered, and as we neared the stranger, grand visions of prize-money or salvage flitted through our brain; but on closing it was found to be a miserable old brig of some 50 or 60 tons, without either masts, cargo, or anything else, all having been cleared out before being abandoned. Still we took her in tow, passing along the west coast of Luzon, its bold outlines and rugged volcanic ranges, covered with luxuriant tropical vegetation, in full view.

The next day, January 11, we entered the harbour of Manilla. Soon after anchoring we were visited by the various officials, and by representatives from the Spanish, Russian, and Prussian vessels in port. One of our own vessels was also here, H.M.S. *Elk*, homeward bound from the China station. Just before we left Hong Kong, Admiral Shadwell had received a telegram from England announcing the proclamation of Don Alfonso as King of Spain, and we were the first to bring the news to the Philippines. It was difficult at first for the Spanish colonists to really credit the news, coming on them so unexpectedly. It caused no excitement, nor were there any steps taken by the authorities to make it public.

The city of Manilla (proper) is surrounded by ramparts, and has running through it a broad river, navigable for ten miles, up which we

went in the steam-pinnace till reaching the landing-place, near the office of the captain of the port, on the right bank of the stream. Everybody rides here, and number of light and handy vehicles are always at hand waiting for hire. Driving through Binonda, the commercial capital, we find the bulk of the business people, full of life and activity, the cigar factories of themselves giving employment to thousands of men, women, and girls. The scenery from either bank of the river is particularly fine, whether amid the wharves, warehouses, and busy population on the right, or the churches, convents, and public walks on the left. In any direction, particularly on the left bank and its neighbourhood, we seldom meet with a carriage or a traveller seeking to enjoy the beauty of the fine scenery of river, road, or villages. One could almost imagine, and expect to find, skiffs and pleasure-boats without number on the river, and yachts and other craft in the bay, ministering to the enjoyment of the people and adding to the pleasures, and relieving the monotony, of life; but there are none. By me, the country villages, the beautiful tropical vegetation, the banks of the rivers, and the streams adorned with scenery so picturesque and pleasing, will not be easily forgotten. Almost every house in these Indian villages has a pretty little garden with bamboos, plantains, and cocoa-nut trees, and some have a greater variety of fruit. Nature has adorned them with spontaneous flowers which hang from the branches or fences, or creep up around the simple dwellings.

While here, the English residents made our stay as agreeable as possible. There was a dance at the consulate, and this, with two or three cricket-matches, soon brought the time round to say farewell to Manila.

We left Manila on the evening of the 14th January, and on the 15th passed down San Bernadino Straits, with land fully in sight on both sides; on the left, the island of Luzon, with the fine volcano of Taal, many high volcanic peaks richly wooded to the top, and low intervening volcanic ridges, partially cleared, with here and there pretty groups of cottages, and patches of yellowish grass or bright green sugar-cane; on the right, the islands of Cabra and Lubang, and then the long stretch of coast of the wild island of Mindanao, showing little cultivation, but said to be full of deer and other game, and to be inhabited by a dangerous race of "Moros," as the Spaniards call all dark men beyond the pale of Western or Eastern civilisation.

About noon on the 16th we passed through the narrows among the islands, and into a little closed sea, about 70 miles long and 35 miles wide, extending from the north point of the island of Tablas

to the strait between the north-east angle of Panay and the south-west point of Masbate. It is bounded on the north-west by Tablas; on the north-east by Romplon and Sabuyan; on the south-west and south by Panay; and on the south-east and east by Pulanduta Point, in Masbate. As this, which we may call for convenience the Panay Sea, seemed likely to be one of the inclosed basins, presenting peculiarities in the distribution of temperature, we stopped to take serial soundings and to dredge. From a depth of 150 fathoms to the bottom at 700 fathoms, the temperature was 51.7° Fahr.; while at the surface it was 80° Fahr. The other temperatures obtained were about intermediate between those in the China Seas on the one side and the Zebu Sea on the other, leaving it uncertain whether the cleft in the barrier, to the depth of 150 fathoms, is between Tablas and Panay or between Romplon and Sabuyan.

Early on the morning of the 18th we were close under the east coast of the island of Zebu, apparently the finest of the Philippines, and we steamed along the coast all the forenoon. A ridge of hills with a rugged crest rises almost from the shore, and behind this there is a second and somewhat higher range. The first range is cleared nearly to the top, and above the clearings there is a belt of trees running to the ridge and fringing it against the sky or against the foliage of the more distant range. Where glimpses can be had into the valleys as we pass, the land seems to be well cultivated. The sugar-cane gives, as usual, the brightest green patches, and the lower slopes are covered with groves of the Manilla hemp plant, but we were rather too far off to make out the other objects of cultivation. The beach is of pure white coral sand, and above it are almost continuous groves of cocoa-nut trees, with here and there groups of native huts—pretty, light, basket-like dwellings, mounted on wooden piles 10 or 12 feet high.

About noon we entered the strait between the ill-starred little island of Matan, where Magalhaens met his death, and Zebu, and had a distant view of the monument erected by Queen Isabella II. to his memory. In the afternoon we anchored off the town of Zebu, an active business place, with a population of about 35,000. There are a few roomy and handsome houses, but for the most part it consists of a lot of tumble-down shanties and rickety old buildings, with a great show of poverty and but little riches. The chief articles of trade are Manilla hemp and sugar; coffee is also grown, and tobacco in considerable quantities. Coal of very fair quality has been found, and would form a lucrative article for exportation; but the great difficulty at this place, as in the rest of these islands, is the scarcity of labour. The natives will not work. The banana, the cocoa-nut,

and the bamboo supply them with all they require of food and shelter; and the additional luxury of a little rice, and dried fish to flavour it, is purchased at the price of half a day's labour in the week. The soil is, however, evidently productive to a marvellous extent; and the same redundancy which almost relieves the natives from the necessity of work supplies the merchant with valuable products with little effort or outlay.

One special object which we had in selecting the town of Zebu as one of our places of call was to make out, if possible, something of the habits and mode of life of the beautiful sponge, the "Venus's flower-basket," which is said to be obtained only at one spot off the island of Matan, close to Zebu. A party of Indians used to this work were engaged, and accompanied our "Philos" in the steam-pinnace to the fishing-ground. They brought with them some curious and ingeniously contrived instruments with which they bring the sponges up; two long strips of bamboo, meeting at an angle of about 45 degrees, to the outer edges of which are secured some forty or fifty large fish-hooks, with their barbs set forward towards the angle. The whole affair is strengthened with an elaborate system of stays, and weighted with stones, so as to sink it to the required depth. When all is ready, it is put overboard, and with a tow-line dragged slowly over the bottom. After about an hour has elapsed, it is hauled in, and several Euplectellas are found entangled amongst the hooks. They have a very different appearance at first from the cones of glassy network which they afterwards present when cleaned. The silver beard is clogged with the dark-grey mud in which they live, buried to about one-third of their height, and the network of the remainder of the tube is covered with a quantity of yellow gelatinous matter, which greatly diminishes their beauty; however, this coating is easily removed by washing and bleaching processes. These dredgings were repeated afterwards with great success, multitudes of these "Regaderas," as the Spaniards call them, being obtained, besides several other sponges of the same group, some of very graceful forms, and quite new to science.

After coaling it was decided to leave, which we did on the 24th January, passing down the channel between Zebu and Bohol. Before leaving our anchorage, a very interesting account had been given of an active volcano in the small island of Camiguin, near the coast of Mindanao. As it was but little out of our way, it was decided to visit it, chiefly with a view to ascertain whether the immediate neighbourhood of volcanic action had any influence on the temperature or other conditions of the sea-water.

About noon on the 25th we were midway between the southern

point of Bohol and the high, imposing island of Siquijor; the splendid mountain-range of Cuernos, in the island of Negros, closing in the view to the westward, with its dense forest and bright green vegetation reaching down to the sea. To the east we could see, at a distance of 50 or 60 miles, the island of Camiguin, its volcano giving out both smoke and steam. From this distance the top of the volcano seemed just on a level with the water, the most prominent part of the island being an older volcano, which rises up behind the active cone to a height of upwards of 5000 feet.

Being in shallow water (375 fathoms) the opportunity was taken to trawl, and eventually a multitude of very small sea-urchins, and other specimens of great interest, were brought up.

On the morning of the 26th we gradually approached the island, and at noon we were close under the volcano, when parties of naturalists landed to explore, and the vessel proceeded on and came to anchor off the little village of Abajo, a few miles distant. It seems, early in the year 1871, this island was visited with several violent earthquakes, which resulted in the first eruption from this volcano; from this date the accumulation of the mountain has been going on gradually, and apparently with little violence. The general colour of the cone is a rich chocolate brown; it has now reached some 2000 feet in height, and its base has gradually extended until it entirely covers the town of Camiguin, formerly the largest on the island (with a population of 10,000 inhabitants). Now only a few ruined wells remain of this town, which was formerly on one of the most fertile and prosperous of the smaller islands of this archipelago. Since the eruptions the island has become almost desolate; only a few hundred inhabitants remain; most of the houses are in ruins, and the paddy-fields and groves of flax are deserted and overgrown with a second jungle. For miles on either side of the volcano the trees are blighted, and vegetation is destroyed by the sulphureous exhalations. Temperatures were taken in 185 fathoms, close to the foot of the mountain; but that shown, 57°, was in no way other than usual at similar depths in these seas.

From Camiguin we proceeded along the west coast of Mindanao to Zamboangan, a distance of 250 miles (occasionally sounding and dredging), where we arrived on the 29th January. The scenery is very pretty. Indian houses were visible through the plantain trees, and cocoa-nut groves; and scattered here and there amidst the woodland of the coast were storehouses, barracks, and a large fortification, with the yellow and scarlet flag of Spain flying, advising us that we were near the seat of government. At the landing-place is a convenient wooden pier, with a lighthouse on it, which is carried

out for some distance into the harbour. From the appearance of the town, I should think that it is not likely to become a port of much importance; there seems but little capital invested, and the trading establishments are on a small scale. The few stores appear to be occupied by Chinese, who supply all the wants the population need.

The second visit of the *Challenger* to Samboangan was to enable a comparison to be made of the change in the magnetism of the ship after a trip north and again south. In October last the ship was swung for magnetic determination here, and it was decided to swing a second time at the same spot on the cruise to Japan.

With this object a day was spent off the island of Malanipa in the Basilian channel swinging for deviation and dip. A party of naturalists was landed at daybreak on the island off which we were swinging, and returned by the time the magnetic observations were over with many birds, including a new species of kingfisher of large size, several parrots, Cape York pigeons and honey-birds. This island Malanipa is covered with a scrub from the edge of the shore to its top, a height of 300 feet, and tracks were seen of wild pigs and deer. The place is uninhabited, but is said to be the haunt occasionally of piratical prahs and canoes.

The *Challenger* returned to her anchorage of Samboangan the same evening. Sunday, January 31, was a day of rest, and afforded an opportunity for a walk in the country. The roads leading from the suburbs of the town were overhung with shaddock, endless cocoa-nut trees, bananas, papaws, and here and there gorgeous-coloured flowering shrubs, whilst anon one came across a muddy pool with the head of a buffalo appearing at the surface. The paddy or rice had all been cut down since we were last here, and cattle driven into the fields, and although missing the brilliant green of the rice stalks, we could not fail to be pleased with the peeps of scenery at the riverside, and the tints, beauty, and inconceivable luxuriance of the foliage and vegetation.

Early on the following morning an exploring party of naturalists and naval officers left for the mountains, taking a tent and five days' provisions. They pitched their camp, about eight miles from the town, and made long excursions daily through the forests, seeking for game. In the meantime the vessel started for the naval station at Port Isabella, in the island of Basilan. We were only three hours running across. Passing between the smaller island of Malamahui and Basilan in a very deep and at some parts a very narrow channel the ship brought up, off the arsenal, coal depot, naval hospital, convict establishment, and fort, the whole called Port Isabella.

The town or village is built at the mouth of a river with a collection of native huts on piles at the back. The hospital is on piles afloat and the arsenal is the work of the sailors attached to the ships of war on this station; a fort, inevitable accompaniment, at the back on a rising ground, gives an air of importance to the place. A major and eighty troops keep the natives and convicts in order, and guard the place from the Moros.

We were told that it was unsafe to wander far from the village, as the native Moros seem to have the idea that the proper treatment for a Spaniard or stranger of any sort is to spear or make "small meat" of him if they catch him in the forests, so we kept clear of the woods, and cruised around the village during our stay.

We made fast to a rickety stage abreast the coal depot, and after a visit to the major and a talk to his wife, who spoke a little French, he gave us the assistance of twenty convicts and enabled us to hire thirty free natives to get the coal on board. Madame Governor was delighted to lunch on board the next day; she had spent three years at Port Isabella, without a lady companion, was inordinately fat, and seedy in her *dishabille*, but, *mon Dieu!* so changed when at lunch. Madame Rachel, you have much to answer for.

After completing the coaling, the vessel returned to Samboangan on the evening of the 4th, and on the following day our exploring expedition rejoined with a good collection of over thirty birds, including hornbills, parrots, kingfishers, &c.—they were enthusiastic in their description of the country, and enjoyed the trip very much. The steam pinnace has been out all day with a dredging party who were very successful in bringing up some good specimens of live red coral and other interesting things from the shallow water in the straits.

A number of goats and pigs were shipped on board to be placed on uninhabited islands near the track of vessels from Australia to China; and after sights for rates of chronometers had been obtained, on the afternoon of the 5th the ship sailed from Samboangan for the great Pacific Ocean.

February 9.—The ship has passed between the south extremity of Mindanao and the island of Saraugau. Drake was close to the same position two centuries ago. At sunset we were near the supposed position of Mata Island, one of the three islands said to exist off the coast; no land was visible, and the latitude of the three islands, Mata, Palmas and Hunter being the same on the chart, it is more than probable that errors in longitude have made one island into three. The morning of the 10th found the ship in sight of T'ulur Islands. After sounding in 480 fathoms, a haul of the trawl brought up

between 40 and 50 crinoids, pentacrinus, and a number of fish and crustaceans; such a haul of crinoids has never before been made. In the forenoon a canoe with twenty men came off from Meangis, the nearest land of which is distant about four or five miles. Their boat, resembling a Kii Island canoe, carried the Dutch colonial flag, but her crew could neither speak Dutch, Malay nor Spanish. Tabac was a word with which they were evidently well acquainted from their eagerness to exchange a few parrots for the weed. In appearance the men were Malays. All wore clothing, and the head man of the party had his hair tied in a knot. The present of a few pounds of biscuit was duly appreciated. In the boat were two cocoa-nuts freshly cut, a few grass mats, and five or six parrots. The men were somewhat afraid to come on board. One of them climbed up the vessel's side and looked on board for a moment, when he again rejoined his companions in great haste. The ship's company were at general quarters, and the appearance of so many armed men would scarcely tend to reassure any stranger.

A few words as we leave this coast may not be out of place as to the natives of the Philippine Islands.

To-day, thanks to a mixture of races arising, first from the ancient communication with the Arabs, Chinese, and Japanese, secondly, with the Malays, Spaniards, and Portuguese, the majority of the so-called natives are a mixed people with but few characteristic differences.

Anterior to our historical period, and before the deluge, the Pacific Ocean, then a vast continent, was occupied by a race of human beings in a state of civilization far above any for which their descendants to-day are credited.

In New Caledonia the remains of an ancient city with paved roads and an aqueduct have been found. In the Marquesas, Navigators, Carolines, and Ladrões many gigantic ancient ruins have been brought to light, and in central America their existence has long been known; New Guinea remains to give up its treasures in this respect. Again Easter Island and its immense monuments speak of a race to-day unknown, and which has passed into oblivion without leaving a "footprint on the sands of time;" and yet the history of the discovery of these places is familiar to us, and the types of the people at the time of those discoveries are well described; they were all similar to the inhabitants of to-day, and consisted of a mixture of Malays and negroes.

I think that the true aboriginal of Polynesia must be sought for amongst the wretched natives of Northern Australia, the free men of New Guinea, the head hunters of Borneo, the Negrito and Tagalo of the Philippines, the mountain men of Formosa, the Ainos of

Japan, and the skull hunters of the Santa Cruz group of the Pacific, with the exception of the Ainos, who resemble more the North American Indian, and to-day, thanks to an invigorating climate, are fine athletic men. The whole of these outcasts have many attributes in common, and probably (possibly) owe their origin to a common stock. All the aboriginal tribes are the deadly enemies of the mixed races who generally occupy the soil between the mountains and the sea coast, and by whom they have been driven to seek security in the hills and forests. In the Philippines the aboriginals are the Negreto and Tagalo, the mixed races the Indios.

The generic name of Moro is applied to all the semi-civilized races under Spanish subjugation, and Montescos or Montesinos to the hill tribes who have deserted the vicinity of the towns and villages to avoid the payment of tribute.

An undoubted mixture of Malay is clearly evident in all the Moros whom we have seen. They are fond of dress, and spend large sums in gaudy-coloured silks and bright jewellery, and the women, particularly when in gala-dress, look well, and they walk as though they were perfectly aware of the fact. All these people seem contented under Spanish authority and subjugation in the towns, but the story is different when away from the repressive elements of troops.

February 12.—Again at scientific work under altered circumstances of temperature and weather, with heavy tropical rain. Bottom found at 2250 fathoms, temperature 35°. The trawling resulted, after a day's work, in rewarding the labours of the staff with three small stones and one shrimp!

The winds continued light, and for the most part unfavourable for reaching Greenwich Island, which it was desirable to sight in order to fix its correct position on the charts. Recently a new route from Australia to China and Japan has been advocated, which includes in it a course somewhat near the position assigned to this island.

A vessel leaving Sydney after reaching 20° south latitude would make for Teste Island, the weathermost of the Louisiade group to the west of the enormous reefs stretching to the eastward for about 200 miles. The discoveries made by H.M.S. *Basilisk* a year or two since have opened up this course; for the surveys by that vessel show that immediately to the east of Teste Island, the reefs sink from the surface to a depth of 10 or 12 fathoms. From there a run of 40 or 50 miles brings the vessel to Goshen Straits, when all risk ceases, and the open sea is gained.

February 16.—Greenwich Island is 1240 miles away, and as we have only passed over 600 miles during the past week, and the winds

continue light and unfavourable, our prospects are not over satisfactory. A search was made this morning for Cartiret shoal—one of the many bugbears to navigators in these waters. On its reported position, 1600 fathoms were found, and 20 miles further on the trawl was at work in 2000 fathoms. Helen reefs, and Cartiret reefs, in the same latitude but 300 miles apart in longitude, are probably one and the same. In the trawl to-day were a few holothurians, some stones and five or six small fish.

February 24.—Ten days of rain and calms have succeeded each other—we are still passing through the belt of equatorials—calms relieved occasionally in our monotonous cruise by meeting patches of floating wood and debris probably washed out of some of the large rivers emptying themselves near Point d'Urville on the north coast of New Guinea, which is situated only about 130 miles south of our position to-day. Just a little over a hundred miles from the philosopher's "El Dorado," it can be easily imagined the pressure brought to bear on the Captain to induce him to alter the proposed line of route and visit Papua. After all he consented, and on the 21st, the ship having crossed the line for the third time with Greenwich Island nearly a thousand miles away, steam was in requisition and a course shaped for Humboldt Bay, much to the joy of all on board.

During the afternoon of the 23rd land was in sight, and the enthusiasm of all was roused by the fact that we were reaching the "terra incognita" of the world and the philosopher's stone of science. As the land was neared, above the well-defined cloud-line hanging over the coast, the tops of a mountainous range peeped out, enabling us to fix the ship's correct position by the Cyclops range on the one hand and Bourgainville mountain on the other.

Shortly after, Cape Caillie and Cape Bonpland came into view, marking the entrance into Humboldt Bay, so named by Captain d'Urville of the French expedition who coasted along the land we are approaching, in his vessel *L'Astrolabe*, in August 1827; since that, the only other vessel recorded as having visited these shores being the Dutch Steamship *Etna* in 1858.

This was our first view of the shores of New Guinea, and all gazed with profound interest at what seemed the portal (as it were) to the most unknown and, up to this date, the least explored region of the earth. It was well known that but few Europeans (if any) had ever trodden the shores we gazed upon, the exploration of which appeared so flattering to the imagination, so likely to be fruitful in interesting results, whether to the naturalist, the ethnologist, or the surveyor, and altogether so well calculated to gratify the

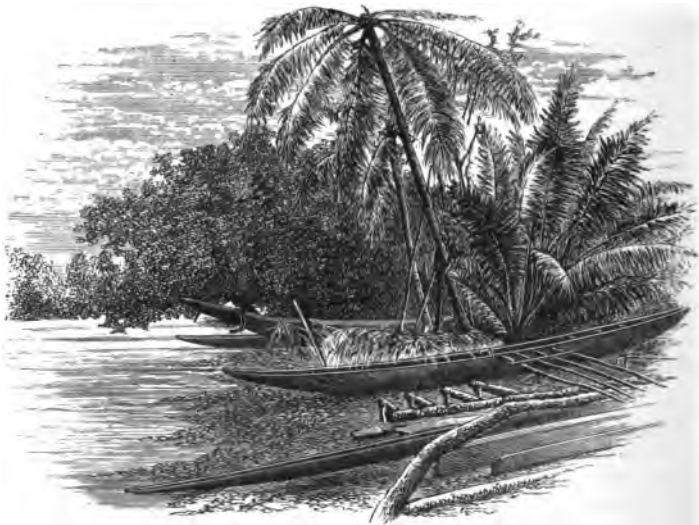
enlightened curiosity of an adventurous explorer, and all were in high spirits at the apparent prospect of getting into the interior of New Guinea, for its plants, birds, animals, and inhabitants would be entirely a new study; so speculation ran high as we neared the anchorage, as to what the next few days would bring to light.

The obstacles which hitherto have been said to bar access to the interior of this continent are fevers, impenetrable forests, and swarms of hostile cannibals; but experience has since contradicted more or less these discouraging reports.

The fevers will be found restricted to certain localities; the cannibals may, by judicious treatment, not prove so bad as represented; and the difficulties of locomotion may be overcome by exploring the great rivers which are known to reach the coast from the interior.

For several days past we had noticed numerous trunks of trees, brought down probably by the river Amboruth, which forms the delta terminating in Point d'Urville, and is supposed to drain the northern slopes of the Charles Louis Mountains. It was dark as we anchored off Cape Bonpland, and at first the only signs of natives were the numerous lights, which formed a kind of illumination all round the shores of the bay.

After a while some voices were heard, and by the light of lanterns a canoe was seen alongside, manned by a few dark forms clad only in their ornaments, consisting of white cockatoo feathers stuck in their woolly hair, or wreaths of bright scarlet flowers.



THE LANDING-PLACE ON WILD ISLAND, ADMIRALTY ISLANDS.

CHAPTER XIII.

HUMBOLDT BAY (NEW GUINEA) TO NARES HARBOUR (ADMIRALTY ISLANDS), AND TO YOKOHAMA (JAPAN).

In Humboldt Bay—Natives alongside—Impressive appearance of the savages—Attempted landing frustrated—Hostility of the natives—Their villages, canoes, &c.—Leave the coast of New Guinea—Admiralty Islands in sight—Anchor in Nares Harbour—Natives alongside—Bartering—Landing at Wild Island—The natives at home—Description of the islands—Survey of the group—Leave the Admiralty Islands—Course shaped for the Ladrone Islands—Unsuccessful in reaching either Ladrone or Caroline Islands—Deepest sounding for the cruise—The Japan Islands in sight—Enter the Bay of Yedo—Beautiful scenes—Anchor off Yokohama.

THE next morning at daylight showed that we were in a most interesting and beautiful bay. The ship was surrounded by about eighty canoes, each manned by half-a-dozen savages, armed with bows, arrows, spears, and stone hatchets. The men scorned the use of clothing, and substituted small wreaths of creepers and





VILLAGE IN WILD ISLAND, ADMIRALTY ISLANDS.

coloured leaves around their arms and legs, and hanging down their back, some adding small belts of plaited fabric. In the matter of coiffure many fashions prevailed. *Imprimis*: the woolly hair clipped or shaven close, except in a ridge through the centre of the head; in others this patch was increased by matted curls sticking up for some six inches from the scalp; others had enormous wigs made of cassowary feathers; whilst, probably among the "beaux," the flock hair was trained to grow at right angles from the head, in the Fijian style; feathers were stuck in at random, and a couple of wooden combs with streamers completed the head-dress. As though this was not fierce enough in appearance, they were stained black in lines and patches on the face and body. Earrings of tortoise-shell were worn, and pieces of shell, bamboo, and boar's tusks, thrust through a hole made in the septum of the nose—thus completing an appearance as horrible and diabolical as the greatest lover of ugly sights could wish. Yet there were many manly-looking young fellows amongst the crowd not so disfigured.

The canoes alongside were the single outrigger, somewhat narrower than those we have before seen, and many had carved, raised, pointed bows. They contained, besides the five or six rowers, an assortment of cocoa-nuts, bananas, sweet potatoes, yams, taro, dried fish, a new fruit resembling a potato, betel nut, one dog, one pig, and a profusion of bows and arrows; a few knitted bags, gourds and waist-belts of plaited fibre completed their outfit: frequently using the word "Seggaw" it was thought by some of us to mean "Iron," by others "trade." Hoop-iron was the circulating medium, and the old hoops off casks, broken in pieces of some three or four inches in length, found ready equivalents in bows, arrows, and any other of the articles they had in their possession.

It was decided to shift our position for one farther up the bay; and as the screw made its first revolution, the astonished natives pointed their arrows at it, as if they expected some enemy to rise from the foaming waters. Slowly we steamed on our way, followed by all the canoes on starboard and port sides doing their utmost to keep pace with us.

At this moment the scene before us was probably the most novel and most impressive of all that had been witnessed in the course of the expedition. Above a sunny sky, swept by a morning breeze; in the background the hilly shores of the bay, covered with the most luxuriant foliage, the trees crowding down to the water's edge, and dipping their boughs into the white breakers; around us a moving mass of dark brown figures, some decked with leaves, flowers, and birds' feathers, others in enormous frizzled wigs and all the savage

glory of war-paint, breastplates, bows and arrows—all joining in a monotonous chant, in unison with the sound of the conch-shell ; in the centre the *Challenger*, at this moment the only representative of Western civilization in this rarely visited region—a period of two thousand years of progress separating us from the people we had come to see. Closing the land, in a bight on the north side of the bay, we opened a village of eight or nine houses built on piles at a short distance from the land. The houses had high pointed thatched roofs, producing quite a strange effect on the surrounding landscape.

Steaming slowly on, for the harbour or bay has never been surveyed, we found deep water close to the beach, which eventually necessitated our anchoring in 37 fathoms, about half a mile from the shore. Two islands lay on one side of us, and a bend of the land with a high projecting point on the other shore ; whilst the range of the Cyclops Mountains, 6500 feet above sea-level, made a good background.

The scenery in either direction was very pretty, and the foliage, of a brilliant green, ran everywhere, even close down to the water's edge.

The canoes remained around us, and a lively trade soon sprang up between the ship's company and the savages. To one unfamiliar with the South Sea trade it was rather a surprising spectacle to see an armful of weapons, belts, necklaces, and earrings, the result of many days' patient labour, exchanged for a few pieces of rusty hoop-iron or a string of beads. Bartering of this sort went on all day ; and when the natives saw some of the trade gear with which we were supplied, it was surprising how their cupidity was excited, and their evident willingness to part with anything and everything they possessed for small hatchets, knives, beads, or iron. The noise and scrambling alongside while this trading was going on baffles all description ; for, besides the usual talking and shouting, they had a singular habit of directing attention to their finery by a loud, sharp-sounding *ss, ss* !—a kind of hissing sound equivalent to "Look at this !" In their bargaining they were generally very honest, passing up the articles selected on the end of their fishing-spear, receiving in exchange the pieces of hoop-iron, which seemed to be much prized by them ; at the same time showing great eagerness to obtain the small hatchets and long knives, but seemingly attaching little value to calico or handkerchiefs, although a gaudy pattern or bright colour was sure to attract their attention.

As soon as we anchored, all our boats were got out, as it was intended to spend a week here and make a survey of the bay ; and great were the preparations amongst the naturalists and others at

the prospect of exploring the beautiful forests, &c., stretched out around us, where altogether everything was likely to be new.

On the first of the boats approaching the shore, it was closed upon by a number of savages in their canoes, and all that could be stolen they laid hands on. A second boat was similarly treated, and they evidently opposed any landing being made with hostile demonstrations, bending their bows and intimating their intention to shoot if we persisted in the attempt. Very judiciously we gave way, although all were fully armed, and the boats returned to the ship, every one feeling disappointed at the result.

Later in the day another attempt was made to land at a village on the other side of the bay; and as the shore was approached, a few natives, who appeared on the platform (which connects their different huts), assumed a threatening attitude at first, but as the party neared, they seemed convinced of their peaceful intentions, and allowed a landing to take place on the beach. A large crowd soon collected around us, and followed in our track through the village. The natives met with have a dark brown skin; they are rather short, but otherwise well-formed, with woolly hair usually stained with a red powder, good foreheads, eyebrows slightly contracted, broad flat noses, with wide nostrils, generally adorned with a pair of boar's tusks, which give them a very fierce appearance; thick lips, retreating chin, and sometimes a little beard and whiskers. The ornaments worn by them are very numerous, besides which they seemed to be very fond of decorating their person with flowers and strong-scented plants. In what might be considered full dress (?), with their face and body painted, the most common fashion was a broad streak down the forehead and a circle round each eye, with daubs of paint round the mouth, and some over the entire body, rendering them inexpressibly hideous in our sight. They were often decorated with belts and breastplates made of the bones of the cassowary and dog, together with long streamers of pandanus leaf. They wear bushy wigs of frizzled hair, dyed in various colours; bracelets and armlets of woven grass, and necklaces of shell, black seed, and dog's teeth.

Nearly every one was armed with bows and arrows. The bow is made of a tough, black, close-grained wood, the string being of bamboo. Their arrows consist of a head of cocoa-nut wood or bamboo, tipped into a light reed, and secured by a neat cane-plaiting. They are variously barbed on the edges, and are so constructed as to break off in the wound and remain there.

Unlike the men, who were entirely naked, the women wear a sort of apron, about a foot square, made apparently of the pandanus

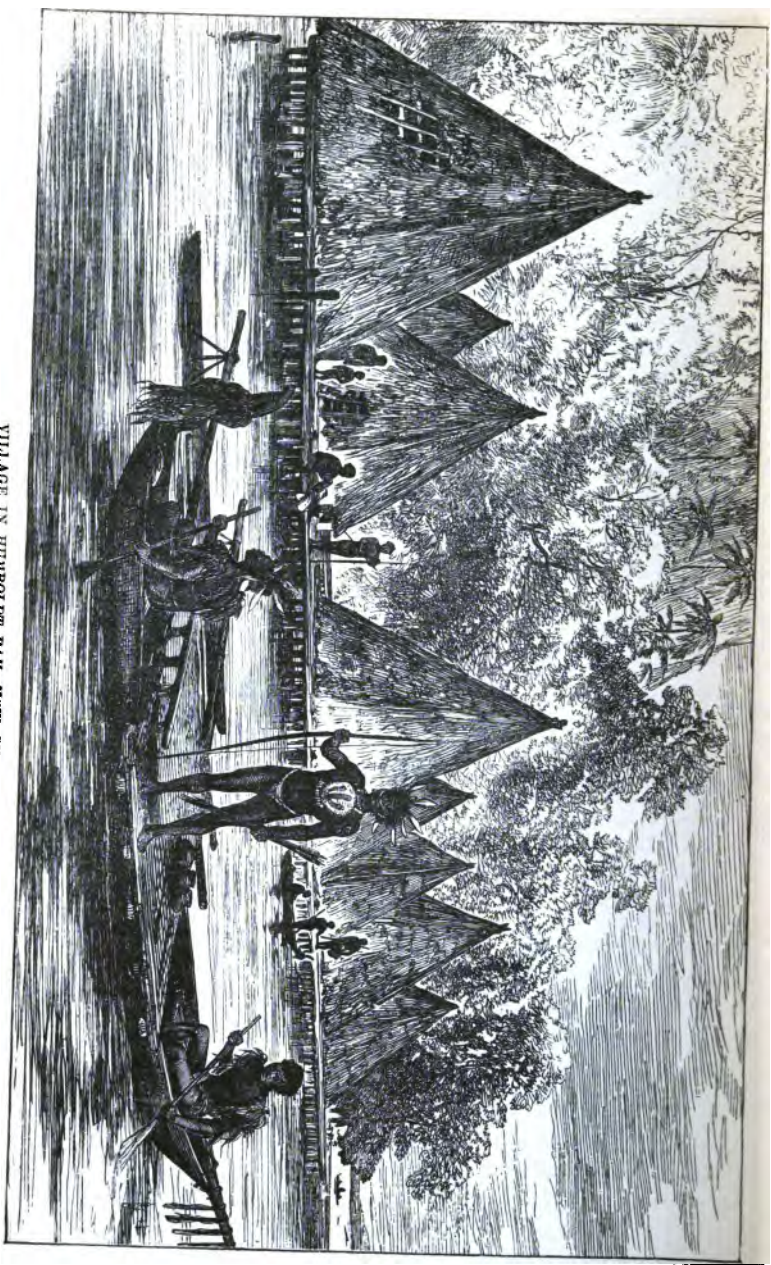
leaf, divided into long grass-like shreds; their hair is cut short. Of personal ornaments, they had none; this seems to be the exclusive privilege of the men.

They would not permit us to look into their huts; so no idea could be formed of what they were like. The village consisted of some dozen or twenty houses, built on a platform on slender posts standing in the water, and connected with the mainland by a sort of bridge. They have tall tapering roofs, covered with palm leaves. As it was not considered safe to venture far (for they are known to be a treacherous race), after a few hours, the pinnacle returned to the ship, still followed by a flotilla of canoes, with the lively and excitable natives trying to keep pace. The canoes, usually from 20 to 30 feet in length, are made from the trunk of a tree hollowed out like a long trough, roundly pointed at each end, not more than 18 inches wide; the sides bulge out below, and fall in again at the top, leaving only some 8 or 9 inches between the gunwales. The bow and stern are alike, and usually carved in various devices. A long outrigger is attached, and on the portion of framing supporting these outriggers are planks or long bamboos, forming a small stage which will accommodate two or more persons, and on which articles for barter are stowed. The paddles have spear-shaped blades, measuring about 6 feet in length; some of very neat description, with blade and handle carved with some fanciful device.

As nothing farther could be done here, steam was in requisition, and before night set in we were fairly off, and out of sight of land. For a week we shaped an easterly course for the Admiralty Islands, sighting Boissy Islands, and on the 28th one of the Schouten Islands, and a few days later the Hermit group. Frequent soundings and dredgings were undertaken with good result, from an average depth of 2000 fathoms. The morning of the 3rd March turned out cloudy and wet. As the day advanced and the horizon cleared, three small islets were seen, which, according to D'Entrecasteaux's chart, lie off the north-west extremity of the Admiralty Islands. Shortly afterwards two other small islands came into view, all situated apparently on the same coral reef. As we approached, several canoes were seen under sail, crossing the line of breakers; and as they passed alongside, the natives made signs of amity by holding up their arms. On nearing the anchorage we found ourselves in the midst of a number of beautiful islands, all girt with white encircling reefs. Each seemed to have its own peculiar beauty; but the eye as well as the mind felt most satisfaction in resting on what was afterwards named Wild Island, where a fine beach was seen, protected from the heavy swell by extensive coral reefs, and affording a convenient landing. The



VILLAGE IN HUMBOLOIT BAY, NEW GUINEA.

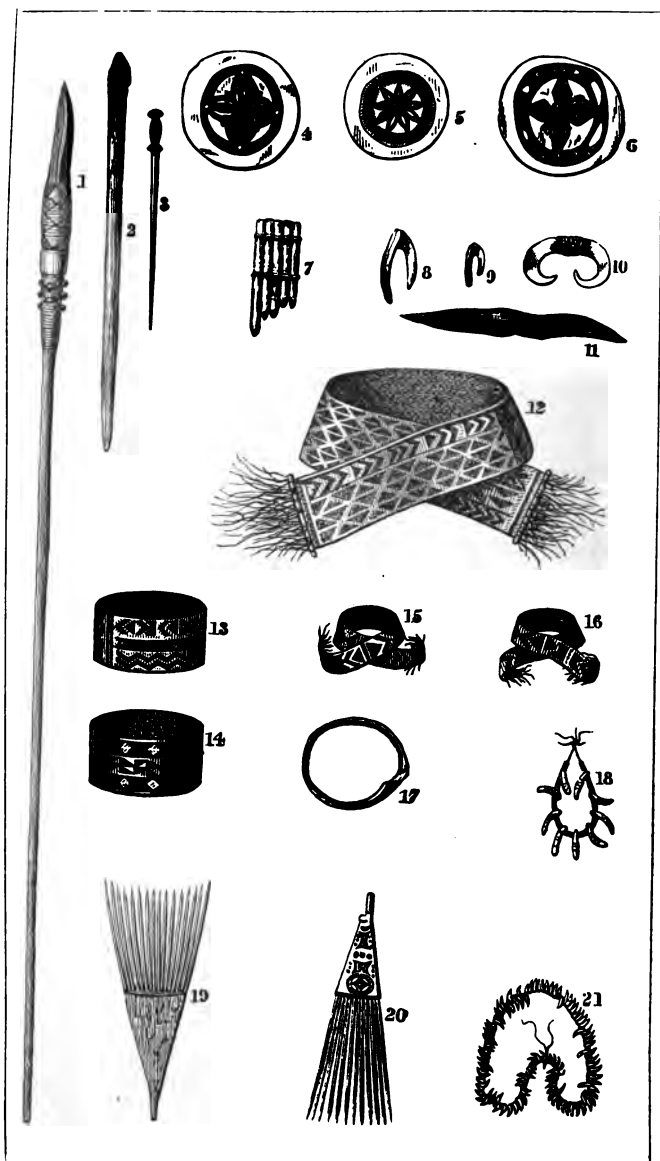


whole island was clad in a thick forest of tropical vegetation. Having reached a convenient anchorage (which was afterwards named Nares Harbour), the beautiful view before us, and the smoke rising from the native huts between the trees completed a perfect landscape.

Next morning at sunrise we beheld a repetition of the scene witnessed in Humboldt Bay. The ship was surrounded by natives, all eager to trade, and the noise made by their combined voices was deafening. The principal articles of exchange were tortoise-shell, spears, stone knives, axes, earrings, bracelets, ornaments worn from the nose, circular plates of white shell, some finely carved bowls, and models of canoes, &c. Hoop-iron and trade-gear (small hatchets, calico, beads, and knives) formed the medium of exchange. To describe the scene alongside is altogether impossible. We soon discovered that there would be no difficulty in establishing a good understanding with these people, and almost immediately a landing was effected, all being armed so as to be on the guard against any treachery; for these islanders are of the same race as those inhabiting the Solomon group, and travellers speak of them as hostile and treacherous. Of their being cannibals, there can be no doubt; so at our first intercourse great caution was certainly necessary. The men were excitable, very noisy and covetous, but not seemingly averse to strangers; they practise chewing the betel nut, which is almost universal, and adds much to their repulsive appearance. The thirst for iron was insatiable and can be well understood, seeing that their only implements were edges of stone, or of a section of a hard shell fixed in a wood handle. After a while, however, when we had got somewhat familiar, and numerous presents had been given to the chiefs, there was no obstacle in the way to prevent our wandering through the village, and even entering their houses and seeing their women and children.

The village consisted of a large number of huts, built of logs of wood covered with a solid thatch of palm leaves, with a fence of the former material surrounding every three or four. The paths and open spaces through the settlement were strewn with white sand, and inside the fence were seen some attempts at ornamental gardening, several bright flowering shrubs being selected.

The natives are somewhat darker (a kind of sooty brown) than those met with in Humboldt Bay. The expression of their faces was decidedly intelligent, and sometimes very pleasing. We noticed no signs of bows or arrows amongst them; their only weapon of defence being a spear, which they make of obsidian, a hard volcanic glass. This is split into the required shape, and fixed to the head of the shaft with fibre coated with gum.



ORNAMENTS OF DRESS, AND WEAPONS, USED BY THE



NATIVES OF NEW GUINEA AND THE ADMIRALTY ISLANDS.

For description, see page 224.

Their clothing is very simple; the women wearing a broad belt round the waist, to which are suspended leaves and grasses reaching to their knees, and the men nothing but a large white shell (*Ovulum ovum*). They have bracelets and armlets, made of plaited grass and fibre, and belts of similar material. Some had bracelets of large sea shells (grinding out the middle and rounding the edges); and ornaments of similar character were hung round their neck and in their ears, which in some cases were dragged down to such an extent that the lower tips of the lobes were within an inch or two of resting on their shoulders. The septum of the nose was pierced, and from it were suspended a number of teeth of the dog, or cuscus, strung on a fibre (hanging in front of their mouth), or a long piece of bone was reeved through from side to side. Human arm-bones, covered with feathers, &c., of the cassowary, hung down their backs. They were in most cases painted over the body, with pigments probably made from pounded charcoal, mixed with cocoa-nut oil, or lime made from burnt shell.

The particular vanity of these people, especially the men, was their hair, which was usually frizzled up into a mop-like shape, or tied in some fantastic style on the top of the head, and coloured with a red clay and oil. Nearly all carried in their hair a comb projecting in front or on one side, usually made of wood, about a foot in

Description of Illustrations in pp. 222, 223.

- Figs. 1, 2. Obsidian pointed spears (Admiralty Islands).
 Fig. 3. Hair ornament (Admiralty Islands).
 Figs. 4, 5, 6. Ornaments of shell and tortoise-shell worn on the forehead (Admiralty Islands).
 Fig. 7. Musical instrument (Admiralty Islands).
 Figs. 8, 9. Fish hooks made of shell (Admiralty Islands).
 Fig. 10. Bone ornaments worn through the septum of the nose (New Guinea).
 Fig. 11. Knife made of obsidian (Admiralty Islands).
 Fig. 12. Plaited grass belt (Admiralty Islands).
 Figs. 13, 14. Armlets of plaited grass (Admiralty Islands).
 Figs. 15, 16. Plaited grass anklets (Admiralty Islands).
 Fig. 17. Shell bracelet (Admiralty Islands).
 Fig. 18. Nose ornament made from dog and cuscus teeth (Admiralty Islands).
 Figs. 19, 20. Combs (Admiralty Islands).
 Fig. 21. Necklace of dogs' teeth (Admiralty Islands).
 Figs. 22, 24, 25. Necklaces of bone, shell, and berries (New Guinea).
 Fig. 23. Comb (New Guinea).
 Fig. 26. Head of stone hatchet (New Guinea).
 Fig. 27. Shell, full-dress of a man (Admiralty Islands).
 Fig. 28. Bone nose ornament (Admiralty Islands).
 Fig. 29. Shell adze (Admiralty Islands).
 Figs. 30, 32. Chinam holders (Admiralty Islands).
 Fig. 31. Grass bag (Admiralty Islands).
 Fig. 33. Ornaments of human bone and cassowary feathers (Admiralty Islands).
 Fig. 34. Waist-belt made of small shells (Admiralty Islands).

length, with six very long, slightly diverging, needle-shaped teeth; the handle usually decorated with feathers and long streamers. Both sexes had their shoulders and arms roughly tattooed. They appeared to be much astonished at our white complexion, which they at first took for the effect of white paint; nor were they satisfied on this point for some time (not until they had actually felt and seen closely). This would almost confirm the supposition that these people had never previously seen any white men. They are, as I remarked before, very fond of using paint as a means of personal adornment; black, red, and white being their favourite colours, with which they also paint their canoes, doorposts, weapons, wooden bowls, and idols. There was not the least indication of any advance having been made towards civilization; yet, with all this, they show a certain amount of intellectual development and feeling for art, decorating their canoes, houses, weapons, and almost every domestic utensil, with elaborate carving and painting. In all our researches and wanderings over the islands we saw no signs of graves, nor could we ascertain with any degree of certainty how they disposed of their dead. From signs they made, such as placing a large earthen vessel on the fire, and indicating that they cut off parts of the body, place in the vessel, and afterwards eat them, our suspicions were aroused that they honour the memory of their friends and relations by eating them. At all events, they had no objection to sell human skulls, of which several were procured, and no sacrifice seemed too great for them if they could only get hold of that priceless material—iron hoop.

The surveyors were away daily during our stay, sounding and fixing the positions of the islands and headlands, and have decided to call the anchorage Nares Harbour, and the islands of the group by the names of the civil scientific staff with the exception of one island, and the reef, to which the name of D'Entrecasteaux is given. To the Professor, Wyville Point on the mainland has been assigned.

A party was made up one day for a visit to D'Entrecasteaux Island, where we found a large village superior to any on Wild Island, and where a pleasant lot of people were ready to welcome us. A portion of the mainland near Wyville Point was also explored, but the dense foliage and bush were most difficult to penetrate and time would not admit of a very long stay; still several new species of birds were obtained, and a rich collection of plants.

On another occasion, on visiting the same island, five goats were taken as a present to the people, who at once showed the greatest horror of the poor animals, which had to be taken away again. A

path through the woods led to a stockade of trees about sixteen feet high and about a foot apart. Inside this was a large village with coral-sand pathways and flowering shrubs.

The huts were large and oval in shape with round thickly-thatched roofs; they are very dark inside, with broad rough seats all round the walls. In some a raised platform or table stood in the centre, where was stowed their bowls, gourds, spears, &c. Each family appeared to live in a separate enclosure, surrounded by wooden palings, and decorated with plants and flowers.

The women, young and old alike, mixed freely with us, and logs of wood were brought us as seats. Among the younger girls there were some well-formed, pretty faces, and many of the boys were bright-looking, pleasing youngsters, not disfigured by betel-nut chewing. The astonishment of all at our white skin was unbounded, and they were never tired of examining and trying if the white paint would not rub off. Here I saw a shell adze used, and fire produced in about twenty seconds by rubbing two pieces of stick together. From this island the goats were transferred to Suhm Island, which is uninhabited, and we hope they may prove acceptable to future traders. The Pinnacle then steamed over to the mainland and endeavoured to find the mouth of a fresh-water river running down from the high land. The water was exceedingly shallow in the bight which was explored, the bottom being strewn with coral patches on which the pinnacle grounded several times.

Eventually the appearance of an opening in the mangroves was seen, and the dingy endeavoured to force her way up the creek, but the water was found too shallow, and the exploration had to be given up. After a bump or two we managed to land at Wyville Point, and struck into the woods for a stroll, but making headway was tedious work, and the swarm of musquitos were ravenous. One could not fail to be struck by the fantastic shapes, richness of colour, variety, size and novelty of the trees, and the wonderfully luxuriant foliage and vegetation by which we were surrounded. Arums climbing fifty feet up large trees as straight as a die, gigantic ferns hanging down fifteen feet from a similar height. Palms, caesuarinas, large trees fallen and covered with fungi, moss and nests of insects, new trees and plants in every quarter, the loud note of the bathis head, the screams of the parrots, the cooing of pigeons, with the amplitude of life everywhere, gave an impression of the place being weird, uncanny, something only read of in fairy tales. The bites of the musquito were not imaginary, and the shrill whistle of the pinnacle to guide us to the beach brought one's thoughts back to reality.

During the day a native dance by women and girls at Wild Island was witnessed, the musical instruments being tom-toms and pandean pipes. Some native skulls were purchased for choppers.

While a-shore on Wild Island we discovered the boarding or fence round one of the buildings had been removed, and it was now seen to have enclosed a temple or Joss house. The posts of the building were carved with two figures, one representing a man, the other a woman with a fish between her legs, painted or daubed in black, red, and white, red being the ground colour of the body. The figures were nude but primitively shaped, with little outline or proportion. In here one day was found a dead body, which we were inclined to think was being prepared for a feast, for, from many indications and signs of the people, we can form no other conclusion but that they are cannibals.

Our intercourse had been friendly throughout; the boats' crews always carried arms, but no necessity for a show of force arose.

It was found whilst we were amongst the people empty-handed all went well, but the moment trade gear, especially iron, is shown, and rewards for personal services made, the greatest confusion prevails; an unfavourable change in the conduct of all takes place, and the lower qualities of their character appear prominently; they become uproarious, insolent, and a retreat to the boats is an absolute necessity. At D'Entrecasteaux Island, one scoundrel jumped on a canoe, yelled, stamped, and raved in a furious manner, whilst several around him handled their spears in a threatening manner, and for a time a row seemed imminent. In the midst of all this we hurried to the boats, but the rest of the men assembled tried to persuade us to remain. After all it was discovered that the cause of the uproar was the present of an adze to one chief, whereas only a chopper had been offered to our rhetorical friend. I believe that gratitude is perfectly unknown amongst them, that they will thief on every favourable occasion, and are not to be trusted to evince any good quality.

We have no record of any visit of Europeans to these islands since that of D'Entrecasteaux, in 1792, who did not land, and could not prevail on any of the natives to visit his vessel. But from the first we seemed to have established a good understanding, and our stay was sufficiently long to render us familiar with the faces of our daily visitors. Their conduct seemed always cheerful and friendly, and they had no objection to come on board, and submit to the processes of being photographed, weighed, and measured.

On the afternoon of the 10th March, the *Challenger* weighed and

steamed out of Nares Harbour, passing with a swell over a rock, with $3\frac{1}{2}$ fathoms of water on it. It was just a touch and go that we had not come to grief, but "All is well that ends well" and Challenger Rock, suspicious ground, marks the spot on the chart for future scientific explorers.

In the natives of Humboldt Bay and Nares Harbour, we had had an opportunity of seeing man uncontaminated by civilization, and free to follow the bent of his own free will utterly untrammelled by society or customs. Under such conditions man is a degraded animal, and the noble savage as great a myth as the elixir of life. And yet, after all, it was with great regret that we left these, in many respects, interesting savages. Before sunset they and their beautiful islands had sunk below the horizon.

On the 12th the ship crossed the line for the fourth time, in longitude $147^{\circ} 53'$ E., and two days after in nearly the same longitude, signs of the north-east trades appeared, and the slow progress of the last month and a half changed for finer weather and a good breeze. We were passing over depths from 2300 to 2600 fathoms until the 18th, when, as we approached the western end of the Carolines, the depth shoaled, and the 19th was devoted to science with poor results so far as trawling was concerned. The wind was not fair enough to allow of a visit to any of the Carolines, and on the 21st all idea of being able to visit Guam was given up, and the distance to Japan posted as only 1650 miles. 23rd.—In latitude $11^{\circ} 24'$ north, longitude $143^{\circ} 16'$ east. Sounding work in a strong breeze was commenced at daylight, and the enormous quantity of 4550 fathoms of line ran out before reaching bottom. There was thought to be some possible error, the time intervals were not good, and the line was hove up. In consequence of the enormous pressure at that depth one out of the two thermometers was broken in every direction, the other in good order and showing a temperature of $33^{\circ} 9'$. A little red mud or clay was procured from the sounding-rod. Not content the sounding was rejected, and we sent down a second rod with four cwt. of sinkers, a pressure gauge and two thermometers. The result was a clearly-defined bottom at 4475 fathoms; the two thermometers were broken, and the index of the pressure gauge forced into the mercury bulb. Other attempts were again made to determine the bottom temperature, but in every instance the instruments came to the surface in a damaged condition. The bottom specimens were found not void of life, some remains of *Radiolarea* being detected amongst it.

This is the deepest authentic sounding on record. The American Expedition last year between Japan and Vancouver's Island, show

4655 fathoms, but they brought up no bottom, their deepest sounding was 4356 fathoms with bottom of yellow mud and sand.

March 30.—Six days have passed and only 500 miles of sea crossed; Japan is still 879 miles distant.

Yesterday preparations were made for a possible landing on a rock marked on the chart as Lindsay Island described as 40 feet high and very barren.

The *Challenger* steamed over the position assigned to it, and 2500 fathoms of water covered any land there, so our anticipated stretch on the shore fell through.

The weather was now getting delightful, the temperature of air only 79°.

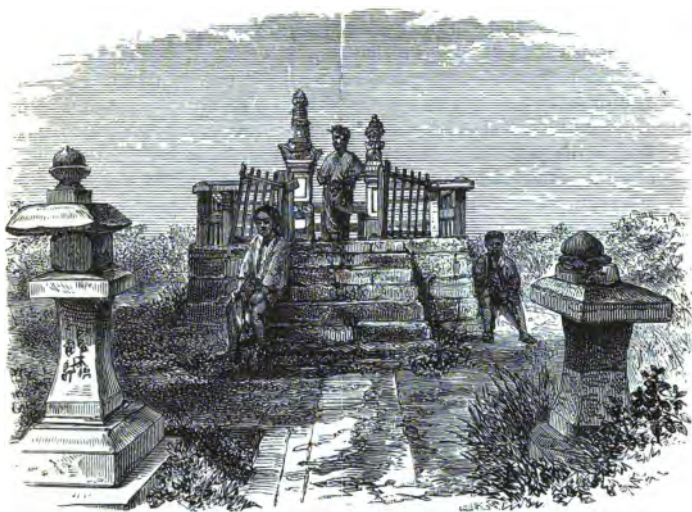
We were clear of the tropics on the 1st April, but in consequence of the continued light winds, and repeated soundings and dredgings, the thirty-two days at sea passed somewhat wearily and monotonously. We were now three months from Hong Kong, but the longest voyage, like the longest lane, must come to an end at last.

April 11.—Early this morning the light on Kuwanon Saki, at the entrance of Yedo Bay, was seen shining brilliantly, and as the day advanced, wind fell light, steam was got up, and we proceeded on towards the anchorage. Island after island comes in view as the bay is entered; many of most picturesque form, with numerous fishing villages scattered along the coast. As we move on, places of great interest are passed, Yokosuka, and soon Kanagawa, then Treaty Point, and Mandarin Bluff, &c., each place having a little history of its own in connection with the early days of the Europeans in Japan.

Yokohama is now before us, with the sacred mountain Fuji-yama, the snow on its high peak looking like frosted silver as it stretches away in the distance, pointing, cone-like, high into the clouds, and far above the elevation of the blue mountains that surround it. On reaching the harbour, and at anchor, the reward begins. It happened to be a fine day on our arrival, the sun was shining brightly, and the few passing clouds cast fleeting shadows on the fine panorama of hills which form the background, producing one of the most pleasing landscapes possible to see. Even to ordinary observers of the picturesque, there was much to compensate for the long, wearisome, monotonous voyage. Many ranges of hills, in graceful lines, carry the eye far into the distance; while the beauty of the shore, with its luxuriant foliage, is aided by cloud and sunshine, which give a most perfect effect, clothing all the mountainsides with purple and russet hues, giving a mantle of rich and ever-changing colour to all the headlands and distant ranges. Junks and

boats, with their picturesque sails, and war-vessels of different nationalities, are never wanting to give life and movement to the whole.

There must be something essentially pleasant in new sensations and novelties in almost every form, since not only do we give ourselves much trouble to acquire them, but generally find gratification when they are secured. No travelling in Europe can rob Japan of its peculiar claims to admiration under this head, for nothing in the West resembles a thousand things that meet the eye. It must often have been remarked how books or photographs fail to enable any one completely to realise a new country and people. Once amongst them, it is discovered immediately that the ideal is something very different from the actual embodiment. This is essentially true of people, towns, and streets, and the effect of costumes, differing widely from those to which the eye has been accustomed. Certainly, as regards the first view of Japan, there are special items, in the figure, physiognomy, costume, and customs of the people, for which even I was not prepared, although I had so recently seen much of the Chinese.



TOMB OF WILL ADAMS AND HIS WIFE, NEAR YOKOSUKA, JAPAN.

CHAPTER XIV.

JAPAN.

Yokohama—The Cemetery—Walks in the environs—Visit Tokio (or Yedo), the eastern capital—Railway from Yokohama to Yedo—Jinrikisha—Sojourn at Shiba—The suburbs of Yedo—The streets and people—"Curio" shops—Lacquer-ware—Street scenes—The great temple of Asakusa—Japanese wrestlers—Leave Yokohama for Yokosuka—The imperial arsenal—*Challenger* in dock—Secluded temple near Yokosuka—Will Adams and wife's tomb—Visit Kamakura—The shrine of Dai-butsu, the great god of Japan—The tea-houses—Leave for Yokohama—Yokohama to Kobe—The rough passage—Take shelter in Oosima—Arrive at Kobe—Anchor in Osaka Bay—Hiogo, Kobe, and Osaka—Railway to Osaka—Its people and streets—The great temple of Tonagee—Cruise in the inland sea—The fine and picturesque scenery—Return to Kobe—Passage to Yokohama—Dredging picnic in Yedo Bay—The results—Japan of to-day.

THE first landing in a new country is generally a moment of some excitement even to the oldest traveller, for the numberless objects of interest to be seen at almost every step fill the mind with admiration

and although it would really take months to see all (in Japan) in detail, yet it is well known that, to the sightseer, a great deal may be crowded into a short space of time; and so one was enabled to realise something of this country and people.

I landed on the 12th April at Yokohama, a town which has within the past few years risen from a small fishing village to a place of great importance, possessing numerous fine buildings, such as a large town-hall, custom-house, imperial post office, and residences for officials and foreign consuls, telegraph offices, banks, several churches, a railway station, race-course, and public gardens; also wide streets, both in the foreign concession and Japanese quarter, with business houses of various kinds; streets lighted with gas; and, if so many Japanese were not met with, it would not be difficult to imagine oneself in some European town.

There are special points of interest to the stranger at every step in Yokohama, whether in passing through the native quarter, where the silk, bronze, lacquer, porcelain, and curiosity shops are located, or a pleasant walk over the Bluff—either will give one a good idea of the topography of Yokohama; while a ride by the new road around Mississippi Bay and through the village of Negishi affords fine scenes and accurate, if not fascinating, pictures of ordinary Japanese life and character.

The cemetery in Yokohama should by all means be visited: the tombs and epitaphs give a vivid picture of the stormy days and dangerous times in the early settlement of Yokohama, when it was unsafe to venture outside the settlement; for the Japanese *rōnin*—a creature as cowardly as murderous, since he always struck from behind—was ever ready to cut down the unwary foreigner.

The most imposing tomb in the cemetery, near the entrance, is that of a murdered Russian officer. The bodies of two Dutch captains, killed in Benteu, Yokohama; Major Baldwin and Lieut. Bird, hewn down near Kamakura; Mr. Richardson, hacked to pieces near Kawasaki; and eleven French soldiers, shot in cold blood near Osaka, are buried in this place. Several other tombs, each possessing an historic interest, are here; in fact, there are few places more worthy of a visit by the stranger, or more profoundly interesting to a student of the early days of the foreigner in Japan.

Piers and canibers run out, and the bay is full of shipping of many nationalities; but by far the greater number fly the national flag of Japan, for the country possesses several war-vessels and a large coasting fleet, manned and officered entirely by Japanese.

Walking into the country, we find shady lanes and trim hedges, with glimpses of wooded hill and cultivated valley at intervals,

which render the place so beautiful that they might be transplanted to England without any violence to the harmony of our own scenery; for here many of our familiar plants flourish, and everywhere our common fern may be seen, while ivy covered the walls, and by the way-side is found the thistle to complete the picture.

Less than five years ago the only means by which communication was kept up between the rapidly growing settlement of Yokohama and the capital of the empire, Yedo, was by the Tocaïdo—the great main road—or by the sea. As the steamers on the latter route were under Japanese guidance, and as blowings-up and runnings-ashore were unpleasantly frequent, the majority of travellers chose the land route. And even by this way the annoyances and accidents were so serious and so frequent that few except those who had pressing business on hand or who were ardent explorers chose to leave the security of the European settlement at all; so it may be said that until the introduction of railways, Yedo remained almost unknown to Europeans. A rickety four-horse van usually made the journey and returned every day. The road was execrable, and the people of the village along the route generally ill-disposed to "white barbarians." A week of fierce sunshine converted the track into a bed of dust, a day of rain turned it into an almost impassable quagmire, overturnings and breakdowns were of daily occurrence, and the safe arrival at the capital was hailed as an unlooked-for pleasure and surprise. English enterprise, backed by English gold, has changed the order of things, and the pilgrimage which formerly occupied five hours and cost ten dollars, may now be performed in forty minutes by rail, at the comparatively reasonable price of one dollar.

The Yokohama terminus is admirably suited to the requirements of the public, and one finds a difficulty in standing under its portals—surrounded by waiting-rooms, cloak-rooms, refreshment-rooms, "Smith's" book-stalls and ticket offices, jostled by diminutive natives clad in the orthodox British porter costume, reading by-laws, advertisements, and notices in English,—and realising the fact that he is in the mystic land of Japan, fifteen thousand miles from London Bridge.

Everything is British belonging to the railway itself. The locomotives are from Stephenson's, and are driven by canny men from the north aided by native stokers. The carriages are from Birmingham, constructed on the American principle—that is with a passage running from end to end so that the guard may walk through the train. Every signal-post, switch, and lamp comes from England. The officials are almost without exception "Samourai."

men of good birth, and have taken wonderfully to their change of profession; the guards are even learning to jump in and out of the trains when in motion with the precision and agility of those at home: in fact, during the short journey between Yokohama and Yedo, one is transported for a while into the old country; and one has only to shut his eyes to the quaint forms and faces of the passengers and the peculiarity of the scenery to make the illusion complete.

A few days after my arrival, I made up my mind to visit the capital. Leaving Yokohama, the train crosses the spit of land connecting the settlement known as Kawasaki Point, passing through the pleasure part of the town—a sort of suburb consisting entirely of large tea-houses and places of entertainment, and stops at the first station, Kanagawa. This was originally intended to be the foreign port, but objections were raised by the European merchants that the depth of water was insufficient to admit of large vessels anchoring conveniently near, so that, in spite of government opposition, the present port of Yokohama was chosen. Glancing out of the carriage window, I could gain but little idea of the village, but on subsequent visits to it I found it a long straggling place, stretching along the Tocaïdo or great road. In the early days of the foreigner in Japan, the people were always ill-disposed to the stranger. Many a bloody record still tells of the days when the proud “Samourai” or officers, felt that they were scarcely doing their duty towards their country in allowing a European to pass unmolested on the road; but now things are different, and the march of civilization has shown the people the benefits of intercourse with outsiders. From Kanagawa the line passes under the great road and enters a broad fertile plain ablaze with many-tinted crops, fringed on the left hand by a range of hills, and bounded on the right by the sea. The peasants are becoming accustomed to the sight of the locomotive and its string of carriages, and rarely stop on their path to gaze at what was but a few months back a wonderful phenomenon.

Tsurumi is a little village also on the Tocaïdo, which I have strong reasons to remember, for it is the centre of the snipe district, and in company with several others it was usual to meet on its little crowded platform knickerbockered Britons with their dogs, and friends from the different ships of war in port, armed with rifle and gun, bent on wading through the paddy mud in search of sport.

From this station the train glides through a delicious stretch of scenery—on the one side little villages nestle amidst the trees, and away in the distance glitters the deep blue ocean. On the other all

is a romantic medley of hill and wood and dale. Here and there a red temple roof breaks the sombre verdure of the hill-side, and at a certain point a depression of the hills affords the traveller a peep at the distant goblin-haunted range of mountains, of which Oyama is the chief, behind which the pure white cone of the sacred mountain of Fuji rises solitary and grand. All around is pure unadulterated rusticity, the iron road cuts remorselessly through pleasant vales and wooded hills, but nothing is changed; and if the visitor will take the trouble to explore on either side—which I had opportunities after of doing—he will find the old world life of Japan still existing as it did centuries ago, when the only Europeans in the land were a few Portuguese missionaries and a small colony of Dutch traders cooped up in an island at Nagasaki. After fifteen minutes' run through this charming country, Kawasaki—exactly halfway between Yokohama and Yedo—is reached. Here the down train from the capital met us, and here we remained for a few minutes, just long enough to see that Kawasaki is a large place, and to learn a little of its former greatness from a fellow-passenger, a young Japanese student in the Naval University, who has already mastered sufficient English to tell me that the city we have just left was one of the most important in the good old days, now gone for ever. On their way from Kiyoto to Yedo, from the western capital to the eastern, the great princes and daimios made Kawasaki their last halting place, and there are still to be seen the shadows of the great feudal age of Japan in the magnificent tea-houses scattered through its length and breadth. Like the old coaching inns on our great main roads in England, these tea-houses have lost almost all their ancient prosperity, as the turmoil of revolution and above all the results of the railway have diverted almost all the traffic from this part of the Tocado.

As we speed on the train passes through huge apple orchards until the houses become more frequent and less detached, and now skirting the sea one visibly approaches a large city, and in the offing are anchored men-of-war, merchant-vessels and trading junks.

The train next stops for a few seconds at Shinagawa, and then on again, passing over the sites of old Yashikis or palaces, and through the once extensive hunting-grounds of the great prince of Tosa, and finally enters the Yedo terminus. The station is the exact counterpart of that at Yokohama, and is situated in the busiest part of the capital close to the foreign concession where the Europeans chiefly reside, and within ten minutes' walk of the celebrated "Nihon Bashi" or Bridge of Japan, from which all distances in the empire are measured.

Outside the station, carriages, jinirikishas, or chairs on wheels dragged by coolies, are waiting. Wishing to reach Shiba, where I purposed staying a few days with Mr. Harding, R.N., one of the professors at the Naval University, I took a seat in one of the latter vehicles; and merely telling my conductor, "Shiba ni iki nasai," off he ran along handsome roads, passing continuous rows of shops, which are open to the streets like stalls at a fancy fair, and which contained all those articles seemingly in common request among the people. Umbrella, fan, and shoe stores abound, also eatables in any quantity; then basket and lacquer work, earthenware, toys, and glass ornaments. However, passing on so rapidly, it was not more than a cursory glance that could be obtained of the novelties displayed. Hundreds of similar conveyances to the one I was in were passing in all directions; while the number of foot-passengers, all apparently happy and contented, gave the scene an air of great life and animation.

Leaving the streets for the suburbs, showy little cottages, each surrounded by gardens laid out with tasteful neatness and artistic skill, are passed; and so through shady lanes, bordered by hedges with rich and waving foliage, until reaching the enclosure where Mr. Harding lived. "Ikura ka," I was taught to say, and I found I had been riding all this distance for an *ichu-bu*. My friend was in waiting to receive me, and we entered the building he occupies, which had at one time been attached to a large temple near at hand, and for which this part of Yedo is famous. The house appears to have been built in the position it occupies with a view to the pretty prospect it commands. It has broad verandahs running round it, every door and partition sliding backwards and forwards in grooves, instead of opening and shutting in our ordinary way.

Entering by the doorway, and passing through a spacious hall, matted according to the government regulation, which prescribes that every mat manufactured throughout the empire shall be of one size we reach the spacious rooms, the walls and panels of which were ornamented with paintings of various animals and figures—tortoises, cranes, dragons, and wondrous unreal monsters. All the furniture, light, neat, and airy, with lacquer-ware, china, and bronzes, gave the whole place an aspect of seductive repose. Opening out from the verandah was a well-cultivated garden, where most that was lovely in nature was to be seen: choice flowers and shrubs; ponds in which were gold and silver fish, ever ready to exhibit their lovely tints, amidst water-lilies and other beautiful aquatic plants. This, then, was to be my home for the next few days. During my stay I made the most of the time at my disposal in

sight-seeing, and under the guidance of my host many a pleasant trip was arranged. We did not confine ourselves to exploring the city alone, although the sights to be seen there were of the greatest interest, but cruised for some miles round, where lie snug little villages with fertile fields highly cultivated, combining to form scenes of beauty and abundance that can scarcely be conceived.

On one occasion, after passing the imperial residence, we ascended one of the highest points of the fortifications in the rear of the castle, from which a fine panoramic view was obtained of the vast city, with its two millions and a half of inhabitants, occupying an area equal to, if not greater than, London. Looking in any direction, the view was one of beauty. Everywhere are picturesque scenes; hill and dale, clothed with brilliant vegetation of sparkling green. Up the hill-side temples tower over the more modest houses of the people, and pretty pleasure villas peep forth from the flowers and verdure of the tea-gardens.

After leaving this, the aristocratic quarter of the city, we went on, passing through streets which seemed interminable, where shops containing miscellaneous assortments of goods suited to the wants of the population were to be seen. At last, when somewhat clear of the crowded thoroughfares, we found ourselves traversing pleasant suburban lanes, occasionally passing spacious enclosures, at one time the homes of powerful princes or daimios, some of which are said to have afforded accommodation to as many as ten thousand retainers within their walls.

I was filled with feelings of astonishment and delight as we passed through fragrant avenues of peach, cherry, and plum trees in full bloom, over arched bridges spanning the bright blue river that flows through the heart of the city, getting here and there glimpses of the exquisite taste displayed in the gardens and cottages along the roadside. No model estate in England can produce structures in any way comparable with those which adorn the suburbs of Yedo. These charming little *châteaux*, raising their thatched roofs amid numberless fruit-trees and creepers, were usually surrounded by flower-beds and artificial rockeries, laid out with exquisite taste. Frequently we met men, children, and beautiful girls, amiable, winning, and full of gentleness, in light and gauzy costumes; their hair tastefully drawn from off their forehead, and fastened with gold or silver pins in graceful knots on the crown. All seemed happy, talking, laughing, smiling—their greetings and salutations assailed us wherever we went.

Here and there, at the end of long avenues, were to be seen gorgeous temples embosomed amongst giant camphor and cedar

trees; standing about at their entrances were lazy-looking priests with shaven crowns, in robes of silk and transparent material. Sauntering up the shady walk, we ascend the steps and enter the sacred edifice dedicated to Buddha. The priest, for a few *tempôs*, shows us all that is of interest.

The floors are matted, the pillars lacquered and richly gilded. A large shrine, with a gilt image in its recess, gold and porcelain vases, lighted candles and tapers, surrounded by a forest of artificial flowers, at once attract our attention. In the rear are the imperial mausoleums, where lie the remains of Tycoons of centuries past. Before leaving, we are reminded of the collecting boxes in various parts of the building, where the pious worshipper fails not to contribute a few "cash," not as an act of charity, but to provide the means by which the priest may be enabled to feed the hungry demons.

The extensive grounds surrounding the edifice are beautifully laid out with refreshing groves of laurel, citron, and peach trees; miniature bridges span little streams and fish ponds, and the number of huge candelabra in stone or bronze present a most imposing appearance. Away in the distance are wooded hills, with spreading pines and sombre yew-trees, giving the scene an air of sheltered repose and secluded rusticity.

As we got farther into the country, the cottages became more scattered, but the scenes presented were equally agreeable, reminding us frequently of the lanes in Devonshire and some of the fairest portions of the Isle of Wight.

At frequent and short distances along the road were little stalls with fruit and tea, the universal beverage, always hot and ready, to quench the thirst of the weary pedestrian.

At length we suddenly came upon a little village embosomed in a wood. Here we stopped for refreshment at one of the tea-houses situated on the edge of a stream, the balconies of the upper room overhanging the water. Entering, we find, through the absence of chairs, sofas, and other requisites we consider essential to our comfort, that, if we would rest, we must seat ourselves, *à la* Japanese, on the clean matting; and joining a party of Japanese ladies and gentlemen, with whom my friend was acquainted, we soon became on the most excellent terms. Refreshments had been ordered, and we were invited to join; but my alarm was great when I saw what was spread before us—lacquer bowls, containing such odd mixtures: fish, raw and cooked; rice, seaweed and soy; slices of strange-looking materials, whether flesh or fowl, it was difficult to say; vegetables and saki. These dishes the pretty girls in attend-

ance seemed delighted, with roguish fun, to press on us, apparently for the amusement our wry faces afforded them. It was a hazardous attempt at first, but, after all, some of the dishes were palatable enough.

By way of lessert, oranges, apples, pears, and sweets were brought in; so there was no difficulty in satisfying our hunger.

Pipes, tea, and saki were afterwards served by our fair attendants, and after the long walk we were glad to stretch on the soft matting for repose while 'mbibing the pleasant-flavoured tea, and inhaling through a short pipe the fragrant tobacco of Japan.

Afterwards the dancers, the Geisha girls, with sam-i-sen, lute, and tom-toms, came tripping in; but they elicited from their musical instruments such discordant sounds that we were glad to take refuge in the balcony, from which point nothing could have been more picturesque than the landscape presented; the hill-sides, dotted with temples and tea-houses, combining to form a scene of beauty that we could not fail to enjoy.

As the evening was closing on us, we took leave of our friends at the tea-house, and retraced our way back to Shiba in a jinirikisha.

A tour through the business quarter of the city is of great interest, for at every step something new is to be seen. The streets are always filled with vast numbers of people, and run on for miles. The shops are filled with goods to suit every requirement: some are rich in specimens of Japanese ingenuity and perfection of work in lacquer, porcelain, basket-work, and bronze, fancy silks, and embroideries spread out in every tempting form.

Like every visitor, I had come with the intention of getting some of the many beautiful things in cabinets and lacquer ware for which Japan is so famed, but the variety on view is beyond my powers of description, for we see lacquer trays, oblong, round, and oval, of beautiful design and wonderfully cheap; boxes and cabinets, with every kind of gold tracery and design, some with birds and trees in raised gold and bronze relief, as rich as well can be, of all prices, from one dollar to five hundred. Besides, these were cabinets of many woods, inlaid, some of infinite ingenuity and perfection of form, opening out into a multiplicity of drawers and trays, of finished workmanship, embossed in silver and gold, such as could not fail to win the most fastidious of mortals.

The silk stores and book-shops are equally attractive. The carvings in wood and ivory, of groups and animals, are in the best style of art. Figures and vases in bronze are artistic and marvellous in their make. China and porcelain from Kiota, Sotsuma, and Nagasaki, beautiful and delicate, with a thousand other articles, are

laid out in tempting array, puzzling the visitor to decide what to select. One can walk on for miles and see a repetition of shops of this description. Wherever we go, the city is full of life and excitement, with a swarming population.

The street vendor, with his ambulatory stock over his shoulder on a bamboo pole, or pitched down at the corner of a street, is surrounded with a varied assortment of odds and ends. The acrobat and conjurer amuse extensive audiences collected round them. The story-teller, with his wondrous tales (after the style of the familiar 'Arabian Nights'), delights an attentive crowd. Hundreds of officials (army, navy, and civil service), all in European costume, are decorated with gold-lace, gilt buttons, and other insignia of rank; even the police and soldiers are after our own familiar models. Jinirikisha men, coolies, and porters dragging carts laden with goods, all help to swell the tide of human life.

Continuing my way, I paid a visit to numerous temples, and in describing the one at Asakusa, which is situated in one of the most populous quarters of the city, I shall nearly convey an idea of the whole. This is one of the largest and most celebrated in Tokio. On reaching the locality, we pass on through long avenues crowded with men, women, and children. Here, on either hand, are stalls filled with nicknacks of all descriptions, with refreshments, and troughs containing sacred water, with numberless sacred towels flying like so many flags. As we approach the Holy of Holies, a large bronze figure of Buddha is in view, and we pass on to the building, gorgeously decorated in gold and lacquer work, with elaborate and ornamental carved roofs and pillars. The sacred shrine to which the multitude come to pray is protected by a large frame of wire netting. A curious practice seems in force with the hundreds who pay their devotions here: they purchase from the priest in attendance small squares of paper, on which are inscribed certain hieroglyphics; these they chew for a time, and then throw as pellets at the grating (which is consequently covered with the results), and the precision with which these pellets strike the grating, or go through the mesh, determines certain inferences as to good or bad luck.

Near at hand are large buildings devoted to various exhibitions, all more or less for the benefit of the temple (in a pecuniary sense). I went to one, and saw the wrestlers. This is one of the sights of Japan. There were some ten thousand visitors present, and some twenty or thirty performers. They were men of immense stature and of immense weight. A circular mound some 10 or 12 feet in diameter, on a raised platform in the middle of the building, is the

place selected for the performance. At a given signal two of the number present themselves and commence the contest. They eye each other for a while, as if watching a chance to catch their antagonist off his guard, stamping the ground as if with impatience. At length they close together, a struggle ensues, the result of which is that one is forced off the mound ; so the contest ends. This was repeated hour after hour, and the audience generally, as they also do in their theatres, come prepared to make a day of it ; for waiters with rice, fish, and other eatables, and saki, are constantly in attendance to minister to the wants of the spectators.

The streets are full of life and movement. People are wending their way home, or to the bathing-house, which, strongly lighted up, shows through its lattice bars crowds of both sexes enjoying the luxury of the bath. The tea-houses are filling, and the plaintive sounds from the sam-i-sen are heard from many of the upper stories. Gaily painted and figured lanterns are flitting to and fro, and light up somewhat dimly the shops and roads, for the gas is not as yet laid on all over the city, and the law still remains in force that everyone after dark shall carry a lighted lantern on which his name is painted.

While here in Japanese waters the opportunity was taken to have the vessel docked, for at Yokosuka, a run of 17 miles from the anchorage (Yokohama), is situated the government arsenal, where some two thousand Japanese workmen are employed, under the superintendence of French officers. Here they have already built two vessels for the Imperial Government, and at the present time there is a large paddle-wheel vessel well on towards completion as a royal yacht for the Mikado, and engines on the most approved compound principle, with high-pressure tubular boilers, are also being prepared. All honour to this nation, which, after living an isolated life for centuries from the rest of the world, has now gone ahead in such an earnest manner, leaving all that any other Eastern nation has attempted far behind. In going over the workshops, which are well supplied with every modern appliance of machinery for successfully carrying out extensive engineering work, we find that steam hammers, forges, lathes, and other appliances in the fitting, smiths', and boiler shops, are in full swing ; so a stranger cannot fail to be struck with the singular combination of energy and perseverance of these wonderful people, who within the past few years have thus almost by themselves laid the foundation of a steam navy, and taken quite naturally to a modern science which was to them altogether unknown, notwithstanding the difficulties encountered at every step. A branch of the Imperial Naval College at Yedo is situated here, where the students of marine engineering have the advantage

of studying the practical as well as the theoretical part of their profession.

- The docks are excellent specimens of work. The longest is 395 feet: in this the *Challenger* was placed, and remained for a week, undergoing certain repairs to the rudder, &c. The second dock is of smaller dimensions, and had the strange-looking vessel which the Government purchased some years ago from the United States (then known as the steam-ram *Stonewall*) under repairs. Basins and jetties made the arsenal quite complete. The harbour is spacious, perfectly landlocked, and easy of access. At the right of the entrance to Yokosuka is one of the small temples, built in a glorious cluster of rare old trees, under the shade of their branches. In this temple is retained one of those forms of worship which have come down from a time which it is impossible even to guess at—a worship founded on the veneration due to the origin of life. Formerly the shrine was richly embellished with votive offerings in stone, wood, and paper of all sizes and colours; but visitors from time to time have carried off the principal ones, leaving almost a barren house with only a few rudely carved offerings.

Near at hand, on the top of a high hill, in the village of Hemi-Mura, are situated the grave and tomb of Will Adams (who was the first Englishman to visit Japan) and his Japanese wife. A large monument marks that of Adams, a smaller one that of his wife. Adams was an English pilot, who left Holland in one of a fleet of vessels bound on a trading voyage to Japan, 1607. After many vicissitudes and great sufferings by the crews, only the vessel in which Adams was reached its destination. The crews were treated at first with great cruelty by the Japanese, but afterwards with leniency and kindness. Adams, having a knowledge of mathematics and shipbuilding, ingratiated himself with the Shōgun, who promoted him to a high position, and he lived in Yedo, beloved by the people, for many years. Not being permitted to leave Japan, he took to himself a Japanese wife. Adams himself chose this spot for his resting-place; and the people living in Anjin chō (Pilot Street), Tokio, defrayed the expense of the tombs and lanterns at the grave, and now celebrate an annual festival in honour of him on the 15th June.

From this position the scenery is very fine. The undulating hills, between which we get glimpses of the open country beyond, where the rice-fields, surrounded with trim hedges, and the wheat-fields of brightest green carpet the uplands, and the clear blue waters of the bay stretching before us complete the charming picture.

In all seasons of the year verdure and beauty of no common

character clothe the hills, broken into a hundred winding vales for many miles around. After seven miles' walking through pleasant fields with trimly kept hedges, passing cheerful country-houses, we reach Kamakura, which lies in a valley inclosed by hills. Almost every spot of ground in and around here is classic to the Japanese, the great bulk of the vast store of Japanese histories and historical romance having their chief scenes laid in or near Kamakura. However, very little now remains of its whilom greatness. The chief place of interest to visitors is the Shintô temple of Hachiman. This temple stands on a plateau reached by sixty steps. In the courtyard inclosing the buildings are compartments in which are displayed some very valuable and interesting relics. About a mile from here is the village of Hasemura, near which stands the famous bronze figure of Buddha, called in Japanese Dai-butsu; the approach to it is through a very beautiful avenue of evergreens.

The immense casting, although not in one piece, is so cleverly joined as almost to avoid detection. It stands upwards of 50 feet in height. Its interior is hollow, and forms a temple, where are numerous gilt idols, chiefly images of Kuanon, with prayers and vows of worshippers, written on papers twisted together. A priest in attendance disposes of historical books and photographs of this great divinity.

The offering of a few cash and the three rings of the bell to summon the spirit are followed by the mumbling of a string of prayers, the meaning of which even to the worshipper is seldom known, and then the devotee, having performed his or her duty for the time, adjourns to the theatre or other places of amusement which are always to be found alongside the temple.

The tea-houses in the vicinity are enjoyable places. There is always something or other to amuse visitors, either gardens with beautiful flowers or an agreeable view of the surrounding country, so as to tempt the traveller to enter and enjoy himself. The eatables, consisting of cakes and various sorts of fish and vegetables, and often sweetmeats, are usually far more agreeable to the eye than to the taste. Tea is the universal drink, but it is not in accordance with European flavour, tasting somewhat like an infusion of wood ashes; yet the Japanese consider it far more wholesome than that which we are accustomed to use. A favourite drink is also made from the peach blossom, which is even worse in flavour than the tea; for the flowers, after picking, are kept in salt, and, when required, a slight infusion is made; these, with saki, a spirit distilled from rice (which the Japanese are very fond of), constitute nearly all their refreshments.

Docking and refitting having been completed, we returned to the anchorage off Yokohama, and on the 10th May left for Hiogo. After passing through the Uraga Channel (where a day was spent in sounding and dredging in 350 fathoms, with very satisfactory results), and getting clear of the coast, there was every indication of squally weather; and soon after we came in for the full force of the north-west monsoon, which with squalls, drenching rain, and a rough and turbulent sea, made the passage very unpleasant.

Our utmost endeavours were used to get round Siwo Misaki, but it seemed almost hopeless attempting to steam against the strong wind and heavy seas. Eventually it was decided to run into the well-sheltered harbour of Oosima. The weather, as soon as we were sheltered under the land, brightened up; and the entrance was not devoid of beauty, as island after island came into view. We passed a peculiar cluster of rocks forming a portion of the harbour at the south-east entrance of the Kii Channel, the Japanese name of which is Ishi Bashi, or Stone Bridge. Two pretty little fishing villages (Hasingui and Kusimota) are here situated, lying at the foot of a range of hills.

During the night the weather moderated, and early the next day we left the anchorage, steamed round the extreme south point of Nipon (Siwo Misaki), and entered the Kii Channel. It was a clear and beautiful morning, but a mist lay along the horizon, which, however, as the day advanced, cleared, and at length the high land of the coast was in sight. All were eagerly watching the beautiful scenery which from time to time presented itself, until at length we anchored off Kobe, in the Bay of Osaka. On either side were towering peaks covered with vegetation to their very summits, and shady groves, among which appeared temples, and pretty cottages, not altogether unlike those seen in Switzerland; while stretching along the bund before us is the foreign concession, with its hotels, clubs, and consular residences, its regular terraces and streets of prim stucco-fronted houses and villas, forming as great a contrast as possible to the surrounding scene.

It was high holiday during a portion of our stay here; everybody *en fête*. Opportunities were therefore presented to us of seeing some of the religious ceremonies and processions for which Japan is so famous. The streets were gaily decorated with flags and festoons of brightly coloured lanterns; little chapels, gilded and varnished, dedicated to little deities, and quaintly carved cars filled with musicians, whose drums and gongs sounded in harsh and discordant clashes, were carried by coolies on bamboo poles; vehicles drawn by girls and boys, gaily dressed, in which were local celebrities, priests

and others; ladies and courtesans followed in palanquins, amidst a host of banners. These processions were kept up for several days, and the festivities continued until late in the evening, when the city was illuminated with lanterns. Occasionally there was a halt made in front of the house of some magnate, when addresses were given, followed by theatrical representations and dancing.

The Japanese hold that one of the best means to propitiate the divinities is to be happy, and not seek to annoy them with incessant prayers and supplications, feeling assured that their gods take pleasure in seeing every one enjoying innocent recreation.

I was, of course, very eager to learn all I could about the country and people, but there was so much of interest, and such a short time to inspect it, that I was frequently almost in despair. These people have for centuries kept aloof from other nations, and retained their manners, customs, and ideas unchanged; these seemed so peculiar to us that it was with some anticipations of pleasure I made one of a party to visit the most important resident of this port, Moumagami, who is brother to the great high-priest of Honganji Kyota. Arriving in due course at his residence, which was situated on the side of a hill, we entered the vestibule, where were several attendants, who saluted us in their national style, which was by passing their hands down the knee and leg, at the same time giving a strong inhalation, indicative of pleasure. Our arrival was now announced to Moumagami, who came forward and welcomed us.

Close at hand a new temple had been reared, and was now to be dedicated to the service of Buddha, in whose honour theatricals and dances were going on. The entertainments presented were so peculiar, and so beautiful were the dresses and decorations worn by those taking part in it, that we could not fail to enjoy the spectacle thoroughly.

The ladies of the household, Noriko and Satshiko, two of our host's sisters, and other friends were present, to whom the strangers were introduced.

They were very pretty women. One in particular I may mention, whose jet black hair, ornamented with amber and tortoise-shell combs, was bound up into thick masses at the back of the head with flowers and ribbons, and further decorated with a number of gold and silver arrows, and similar ornaments. Her costume was very beautiful—pale grey crape, embroidered with gold and silver, and a profusion of flowers. It was lined with a bright blue silk quilting, which formed a train on the ground. Only a part, however, was visible, as the silken belt round the waist allowed it to open only very slightly. Over this she wore a broad sash of dark colour, embroidered in gold, and tied in a very large knot behind. This

was the obi. The sleeves were long, and reached nearly to the ground. All the colours of the dresses worn by the company harmonised so beautifully that, although there was a most brilliant collection of tints, the aspect was most pleasing. The Japanese invariably show exquisite taste in the arrangement of colours.

Tea, sweets, and saki were served in diminutive china cups, and before we left, attendants brought in, and placed before each, gold and lacquer bowls with chopsticks. Chicken and vegetables, duck and sweet jelly, fish and seaweed, were passed round.

At first we found some difficulty in using the chopsticks, which amused our fair friends very much; nor could we help laughing ourselves at our awkward attempts. Then pipes and tobacco were in requisition, the ladies joining; and although their pipes are small, and the tobacco used is of a delicate description, I should infer from what I saw that they are great smokers.

It was near sunset as we took our leave, the ladies bowing low and speaking a few words in their native language, which we understood to be all sorts of good wishes for our future success, the host accompanying us to the porch bidding us farewell.

We had spent a most agreeable and entertaining day, the kindness, hospitality, and general good temper of our host and hostess leaving a very pleasant impression.

The view from this point was very fine, embracing the far-off hills of the opposite shore, the island of Awadji, at the entrance of the inland sea, the river to Osaka, and an ever-moving mass of white sails of junks and boats; while stretching out below us lay the richly cultivated plain, dotted with white roofs, amongst the bright colours of the cornfields and the sober olive of the surrounding foliage.

During our stay we visited Osaka, which is about 30 miles from Hiogo. There is a railway between the two, and trains run frequently during the day. The trip is most enjoyable. Nearly the whole way lay along slopes and through villages, valleys intervening between the sea and mountain ranges. An hour's run and Osaka is reached. This is one of the five imperial cities, and is most pleasantly situated in a fruitful plain near a navigable river, which is spanned by upwards of a hundred bridges, many of extraordinary beauty of design.

The streets are, as in all Japanese towns, very narrow; still they are regular, and cut each other at right angles. The internal arrangements of the shops are simple and uniform, though somewhat modified according to the business of the occupants; still there is a great sameness in every town.

The buildings are not of a very imposing character, with the exception of the temples, many of which are splendid specimens of art, rich in gold and lacquer work ; particularly the one at Tonagee, with its grand and stately pagoda, from the top of which a fine view is obtained all over the city.

One word on the religion of the people. Amongst the lower classes the old faith of Shinto and the newer doctrine of Buddhism are indiscriminately professed. With the higher classes, beyond a firm faith in the power of their ancestry, whose spirits are propitiated by every means, there seems to be no religious feeling, and the prayers and protestations of the poor with the gods and spirits portrayed in the temples form a subject for their amusement.

The Shoguns fostered Buddhism whilst the Mikado's family remained true to Shintoism. To-day all attempts have been made to purify the Shinto faith ; but in every case of the mixture of the worship of the two sects in the same temple, the buildings have been destroyed by fire and the unfortunate priests left to do the best they can.

A week was spent at Kobe, and on the 25th May we left for a cruise through the inland sea.

It seems impossible to do justice to the beauty of the scenery here ; talented writers have attempted the description, but the best have failed, and to my mind fall far short of the beautiful reality. Assuredly I cannot paint its loveliness adequately by any words of mine.

Amidst this beautiful scenery we remained for a week, occasionally dredging, but not with much success. At the close of each day we anchored off some pretty little village, and then made our way on again early in the morning, until reaching Matsuhama, which is about halfway through, when our course was altered so as to return to Hiogo. There appears to be an extensive traffic, from the vast number of junks and coasting-steamers daily met with, and swarms of fishing-boats seem to abound everywhere, making quite a lively scene. All this, with the marvellous richness and fertility of the innumerable islands, leaves nothing to be desired. On the 29th we reached Hiogo, and once more anchored in Osaka Bay.

On the morning of June 2 we left Osaka Bay for Yokohama, where we arrived and anchored on the 5th. Swung ship for magnetic and azimuth corrections ; coaled, and filled up with stores and provisions for a long voyage. Before finally leaving Yokohama, a large number of the European residents, together with many of the members of the imperial government from Tokio, Sir Harry Parkes (British Minister) and Lady Parkes, many of the American, French,

and Japanese naval officers, accepted invitations to take a trip for a few miles in the Bay of Yedo, for the purpose of witnessing the operations of sounding, dredging, and trawling for specimens of marine zoology.

The weather at first was most unfavourable (wind and heavy rain). However, it eventually cleared, and a large party of ladies were amongst the number of visitors. About noon we steamed out from the anchorage, and when an offing of some four or five miles had been gained, preparations were made for the first operation, which was sounding. The depth was found to be 120 fathoms. The trawl was lowered. The processes were watched with seemingly great interest by the guests on board, and after a short interval had elapsed, the trawl was drawn up by the deck engine. The anxious crowd gathered on the bridge, and as fathom after fathom of the line came in, each held their breath in expectation of what was coming. They were, however, not kept long in suspense. First appeared the shackle, then the trawl itself, with a few specimens of life from the bottom, including fish of various kinds, shells, stones, and mud. Water-bottles were lowered, and specimens obtained from various depths. The mode of taking serial temperatures was also fully illustrated.

After this lively scene, in which the different opinions of the learned in such matters were often amusingly expressed to their lady friends, it was time to adjourn for lunch, which was followed by a dance as a finish; so on the whole we had a most enjoyable time. It was after five before the vessel returned to her anchorage.

With a large paper currency, a national debt, an army, and a fleet, Japan to-day takes her stand amongst civilized nations; but her best and warmest friends look with dismay at the future of the country.

In the tide of prosperity all was "couleur de rose," ahead there is many a dark cloud. Tea and silk are the principal exports. The demand for the former is not nearly as great as ten years ago, and the latter at its present price is not able to be put into competition with the produce of Italy and the south of France. Cheapness of labour seems to me the only advantage on the side of the Japanese grower in his effort to vie with the rest of the world. The country is not rich, and men who have travelled through it and are competent to judge, assert that the supposed immense mineral wealth is greatly over-estimated. We know that, as now worked, the gold mines are a source of loss rather than profit.

Coal is found, but its quality is not good enough to compete with Australia.

From whence, then, will the revenue necessary to balance the yearly increasing expenditure be drawn? To secure this a strict economy and many alterations seem absolutely necessary.

We can only hope for the best, and trust that the manly, noble efforts of the Japanese people to improve themselves and their country may lead to a great future for great Japan.

Outside the station, carriages, jinrikishas, or chairs on wheels dragged by coolies, are waiting. Wishing to reach Shiba, where I purposed staying a few days with Mr. Harding, R.N., one of the professors at the Naval University, I took a seat in one of the latter vehicles; and merely telling my conductor, "Shiba ni iki nasai," off he ran along handsome roads, passing continuous rows of shops, which are open to the streets like stalls at a fancy fair, and which contained all those articles seemingly in common request among the people. Umbrella, fan, and shoe stores abound, also eatables in any quantity; then basket and lacquer work, earthenware, toys, and glass ornaments. However, passing on so rapidly, it was not more than a cursory glance that could be obtained of the novelties displayed. Hundreds of similar conveyances to the one I was in were passing in all directions; while the number of foot-passengers, all apparently happy and contented, gave the scene an air of great life and animation.

Leaving the streets for the suburbs, showy little cottages, each surrounded by gardens laid out with tasteful neatness and artistic skill, are passed; and so through shady lanes, bordered by hedges with rich and waving foliage, until reaching the enclosure where Mr. Harding lived. "Ikura ka," I was taught to say, and I found I had been riding all this distance for an *ichu-bu*. My friend was in waiting to receive me, and we entered the building he occupies, which had at one time been attached to a large temple near at hand, and for which this part of Yedo is famous. The house appears to have been built in the position it occupies with a view to the pretty prospect it commands. It has broad verandahs running round it, every door and partition sliding backwards and forwards in grooves, instead of opening and shutting in our ordinary way.

Entering by the doorway, and passing through a spacious hall, matted according to the government regulation, which prescribes that every mat manufactured throughout the empire shall be of one size we reach the spacious rooms, the walls and panels of which were ornamented with paintings of various animals and figures—tortoises, cranes, dragons, and wondrous unreal monsters. All the furniture, light, neat, and airy, with lacquer-ware, china, and bronzes, gave the whole place an aspect of seductive repose. Opening out from the verandah was a well-cultivated garden, where most that was lovely in nature was to be seen: choice flowers and shrubs; ponds in which were gold and silver fish, ever ready to exhibit their lovely tints, amidst water-lilies and other beautiful aquatic plants. This, then, was to be my home for the next few days. During my stay I made the most of the time at my disposal in

sight-seeing, and under the guidance of my host many a pleasant trip was arranged. We did not confine ourselves to exploring the city alone, although the sights to be seen there were of the greatest interest, but cruised for some miles round, where lie snug little villages with fertile fields highly cultivated, combining to form scenes of beauty and abundance that can scarcely be conceived.

On one occasion, after passing the imperial residence, we ascended one of the highest points of the fortifications in the rear of the castle, from which a fine panoramic view was obtained of the vast city, with its two millions and a half of inhabitants, occupying an area equal to, if not greater than, London. Looking in any direction, the view was one of beauty. Everywhere are picturesque scenes; hill and dale, clothed with brilliant vegetation of sparkling green. Up the hill-side temples tower over the more modest houses of the people, and pretty pleasure villas peep forth from the flowers and verdure of the tea-gardens.

After leaving this, the aristocratic quarter of the city, we went on, passing through streets which seemed interminable, where shops containing miscellaneous assortments of goods suited to the wants of the population were to be seen. At last, when somewhat clear of the crowded thoroughfares, we found ourselves traversing pleasant suburban lanes, occasionally passing spacious enclosures, at one time the homes of powerful princes or daimios, some of which are said to have afforded accommodation to as many as ten thousand retainers within their walls.

I was filled with feelings of astonishment and delight as we passed through fragrant avenues of peach, cherry, and plum trees in full bloom, over arched bridges spanning the bright blue river that flows through the heart of the city, getting here and there glimpses of the exquisite taste displayed in the gardens and cottages along the roadside. No model estate in England can produce structures in any way comparable with those which adorn the suburbs of Yedo. These charming little *châteaux*, raising their thatched roofs amid numberless fruit-trees and creepers, were usually surrounded by flower-beds and artificial rockeries, laid out with exquisite taste. Frequently we met men, children, and beautiful girls, amiable, winning, and full of gentleness, in light and gauzy costumes; their hair tastefully drawn from off their forehead, and fastened with gold or silver pins in graceful knots on the crown. All seemed happy, talking, laughing, smiling—their greetings and salutations assailed us wherever we went.

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a steam laundry employing about thirty hands, and capable of turning out forty to fifty thousand pieces in a week. There are half-a-dozen newspapers published, two of which are monthly, and four weekly. There are free libraries and reading-rooms, fire-engine companies, Masonic, Odd Fellows' and Good Templars' lodges, theatres, and other amusements, so as to keep pace with the times.

The stamp of social life is unmistakably American. The currency, the hotels, and private companies are all types of the Great Republic. The principal business done has hitherto been with America, the great majority of Hawaiian citizens and public men have been Americans, the government and constitution have been largely framed by the aid of American influence, and though the independence of the Hawaiian Government is secured at present by a tripartite treaty between England, America, and France, the destiny of the Sandwich Islands will probably be what its geographical position would indicate—annexation to the United States.

His Hawaiian Majesty Kalakua is a monarchical ruler, with a paraphernalia of sovereignty as imposing in design, if not in execution, as that of Great Britain itself. Each of the eight islands that are inhabited is governed by a viceroy, under the king. Then there are privy councillors, ministers of state, and other high functionaries, the Legislative Assembly consisting of forty-five members, thirty of whom are elected by the people and fifteen appointed by the king, who hold their seats for life. In addition to all this there are a host of dignitaries with mysterious names and functions taken most faithfully from the models of European courts. The Hawaiian ministry does not hold office at the will of a majority of Parliament, as with us, but as long as the king pleases, irrespective of what Parliament may think. The public money is supposed not to be expended even by the king without a vote of the Assembly. The Hawaiians formerly possessed two Legislative Houses, but now the nobles and representatives sit and vote together. The experiment, however, does not, it is said, work quite satisfactorily, and there is a party agitating for the reconstruction of the Council of Fifteen. There are two qualifications necessary to enable a man to vote for a member of Parliament here—he must be able to read and write, and have an income of 75 dollars a year.

The kings of Hawaii do not succeed to the throne exactly as sovereigns do in England, but are appointed by the nomination of the preceding sovereign or by the vote of the Legislative Assembly. The late King Lunalilo died in February 1874, without naming his successor. There were two candidates brought forward for the vacant throne. One was the Queen-Dowager Emma (widow of

Kamāhameha IV.), the other was a high chief named David Kalakua. David was elected by thirty-nine votes, Emma receiving only six. The result was a riot on the part of the supporters of the defeated candidate, which was soon, however, quelled, the English and American war-ships in port sending to the rescue a number of blue-jackets and marines. The rioters were afterwards imprisoned and peace restored.

The revenue of the Hawaiian kingdom is about 500,000 dollars a year, and is derived principally from taxation, from certain duties, and from the sale of government land. The local tax amongst the people is five dollars a year—two dollars for roads, &c., two for education, and one as a poll-tax.

The entire revenue of the king is at the rate of 50,000 dollars per annum, and each of the principal ministers of state receives 5000 dollars.

Soon after anchoring, opportunities were afforded for a run on shore, and a great crowd was assembled on the landing to give us a hearty welcome. Men and women of a rich brown colour, with long, wavy, black hair and large brown lustrous eyes, all seeming happy, talking, laughing, and smiling; their greetings, "Aloha!" assailed us wherever we went, floating on the breeze sweet as the sound of distant bells. As I passed through the midst of this thronging crowd, every step seemed to reveal something new, and to recall recollections of my previous visit here, some eighteen years ago.

I cannot say that there is any great beauty in the location of the town, or much taste displayed in its plan; but the streets and dusty roads may soon be exchanged for one of the most agreeable and delightful climates possible, by a short ride to the Pali, through the Nuanu valley, which is formed by a break in the central volcanic ridge of the island.

The entrance to the valley, for some considerable distance on either side, has a number of charming residences of the wealthy settlers, forming, during the summer months, pleasing retreats from the heat of the city. It would be difficult to adequately describe the scenery, or what the architecture of the villas is like, so beautifully are they festooned with flowering plants and evergreens; shady lawns, too, stretch out in front with every variety of charming vegetation, and trees send their pleasing shadows over all. Thus it is for some miles, until reaching the cemetery, cosily situated in a wayside hollow; and almost opposite is the royal mausoleum, where the remains of the Kamehamehas lie entombed. The road narrows somewhat now, and the green taro patches and charming avenues

afford a most agreeable relief to the eye, enhancing the beauty of the views from the various colours of the foliage, produced evidently by the fertilising showers from the clouds, which are occasionally seen lowering on the mountain peaks, where they are, as it were, held in check and condensed, producing numerous small waterfalls, leaping from rock to rock on all sides, and being again distributed by the natives for irrigating their taro patches, and for giving fertility and luxuriance to the plains below.

The valley takes numberless eccentric windings, and the peculiarity of the scenery is, that the hills, which rise to several thousand feet, are precipitous ridges, broken up into all sorts of fantastic shapes, which suddenly terminate in deep precipices known as the Pali.

The beauty of the scene from here is unsurpassed in the island: stretching away seaward are the coral reefs, with the white wavy line of endless surf breaking restlessly over them; while in the valley below are charming glimpses of vegetation; clusters of palms and sugar-cane, interspersed with native huts, each surrounded with its little plantation of bananas and other fruit, suggesting the boundless liberality of nature.

Away to the left is a barren volcano, aptly called the Devil's Punchbowl, and on the left an equally barren hillside; from this point of view Honolulu appears like a natural botanic garden, and is pretty in the extreme. The many spires of the churches lead one to reflect on the great good missionary labours, have brought about during the last fifty years, and on the hardships and privations undergone by these pioneers of civilization in the endeavour to carry on the good work undertaken by them.

From the position of our *coup d'œil*, we pass along—always mounting a gentle incline—a rough road, and leaving a few taro patches and native huts behind us, reach the “halfway house,” the abode of one of the many Bohemians of this world; a fellow countryman, in this instance, whom I looked upon as a fair specimen of the class of men who lead a life of restlessness among the islands of the Pacific, sometimes in affluence, more frequently in poverty, accepting every change in life as “Kishmet,” and when sober, which in the end is seldom, evincing a knowledge and signs of education far above the station of life in which they are found. Jim, the owner of the “halfway house,” was such a man, and, when I passed that way, was engaged in an upbraiding complaint against two of his acquaintances whom he had a short time since entertained from his stock-in-trade (home-made beer, an awful concoction), and who, whilst he himself was suffering from the effect of the “bout,” had emptied his pockets and disappeared. Jim seemed to entertain no

very serious enmity or idea of revenge; he simply thought their conduct "warn't exactly right," and was probably prepared to engage in another "outing" with the same "friends" when an opportunity should offer. After leaving these quarters, the hedges disappear and the country is open and dotted with patches of Candle-nut and Koi trees. A walk of two miles through such a country, with the hills rising to the dignity of mountains, and the valley gradually narrowing, leads one to the gap or Pali, a break at a height of 1207 feet in a range of mountains of 3000 feet from the plain. Through this gap the trade-wind blows as through a funnel; from here a grand view, unique in its way, is gained of the plains to the sea on the weather or green side of the island.

A half hour passes quickly and pleasantly at the Pali; one's companions are the boatswain and frigate birds, with the occasional passing of a native on horseback from the valley on the green side.

During our stay it was a daily treat to stroll along the shady streets, and out through the pleasant roads, particularly on Saturdays, which seemed a sort of gala day, when the roads were usually thronged with natives of both sexes on horseback, riding up and down at full gallop, and seeming perfectly at home in the saddle—the women even more so than the men; they sit astride barefooted, with their bright-coloured riding-dresses, like banners, streaming behind them, all apparently happy and reckless; their bright eyes flashing, their long black hair, encircled with garlands and wreaths of flowers, making a gay and graceful spectacle. The men looked hardly less attractive, for they had wreaths of bright flowers round their hats, and garlands around their throats.

Sometimes a crowd of these careless riders came galloping in from the plains, full of fun and laughter, accompanied by a lot of blue-jackets on leave from the *Challenger*, rushing on, helter-skelter, upsetting everything and everybody they came in contact with; bestriding their horses as they would a topsail-yard in a breeze; hanging on to manes and saddles, and evidently enjoying themselves to their heart's content.

One of the sights of Honolulu is the fish-market, and there we were escorted one Saturday afternoon. Although only a tumble-down sort of a place, with a number of rickety stalls, yet these were in many cases covered with numberless varieties of blue, red, and yellow fish, spotted and banded, and striped in the most striking manner. Of shell-fish also there was abundance, cray-fish, lobsters, crabs, and many strange orange and rose-coloured medusæ, and here and there little heaps of various qualities of sea-weed, of which the natives are particularly fond.

Here, strolling about making purchases, we saw a laughing, joking crowd of men and women; the latter clad in a single bright-coloured or white garment, falling free and in unconfined folds from the shoulder to the feet, while all wore wreaths of gorgeous flowers round their jaunty hats. The men, with their cheerful, smiling faces and friendly greetings, added greatly to the animation of the scene. These people are, on the whole, much better-looking than those met with farther south. The nose is less flat, the lips are less prominent; the colour is a nearer approach to white, and the face is altogether more indicative of intelligence and good-nature, and they take more kindly to the forms of European civilization.

Of public buildings, the new Legislative Assembly Chambers rank first; they form an extensive pile of buildings of the most modern style, built of concrete, from plans prepared by a Sydney architect, at a cost of \$120,000. I had an opportunity of going through the spacious halls of this massive structure; they are elaborately furnished, and each appropriated to some department of law and justice. The Council Chambers are only required for a short session once in two years, for voting the required supplies.

In the absence of other outlets for the public funds, the Government, at the instigation of a popular member of the Ministry, voted a large sum of money for building an hotel for the attraction and convenience of visitors. Plans were completed, and the building was finished in 1874. It consists of a large concrete, two-storied house, well situated, with verandahs decorated and festooned with flowering trailers, covering up all that might be unsightly with jessamine and clematis, and bright and pleasing flowers. It stands on a trim-kept lawn, planted with exotic trees, lending shade and beauty to the whole. Military bands occasionally play, and the large number of visitors give quite a busy and imposing aspect to this portion of the city.

The churches claim our attention, and Sunday proved a most pleasant day. Church-bells rang, and the streets and roads were filled by the people in their holiday attire.

Whatever may be the religious requirements of other islands of the Pacific, the wants of the Hawaiians are well supplied. At least three of the great denominations work side by side. The Roman Catholics, who were introduced to the islands by the aid of a French man-of-war, have had a large church, a local habitation and a name, since 1847, and now number a very large proportion of converts amongst the population of the islands.

The Church of England has had a Bishop, if not a very large

ecclesiastical interest, here since 1862. The cut-stone cathedral, brought all the way from England by Bishop Staley, is still the work of the future. The foundations were laid some years ago by the late king, but the superstructure lies packed in cases within the church inclosure. The funds being exhausted, the chance of erection is somewhat remote. The services are at present carried on in a small temporary building, on which some 20,000*l.* has been expended, and in this Bishop Willis (Dr. Staley's successor) carries out a daily High Church ceremonial, which, from the scanty number of worshippers, does not appear to be very attractive.

The Wesleyan Methodists have a church, but I learnt that this body has not succeeded in making any great head-way in the islands.

It is due to the early missionary enterprise—carried on principally by the American Board of Missions (embracing the operations of the Presbyterian and Independents)—that any moral change has been produced amongst these people.

There are two native churches; one of which is a large structure, built of coral stone, fitted up with modern pews and carpeted floors; it boasts of a trained choir and an organ of superior construction, with a Sunday-school building at one end, and a church sociable, after the American fashion, underneath.

The Queen's Hospital, the Court House, and the Iolani Palace almost exhaust the list of Public buildings. The Palace is only a small frame building, standing in solitary grandeur in an inclosure of about an acre in extent; but plans are being prepared for a larger structure, and probably we may soon hear of its commencement.

There remained only to hear the Royal band, which played in the hotel grounds, and with which I was much pleased. The national anthem, which was "God save the King" until a short time since, has now been changed to the "Dead march in Saul" with variations. The bandmaster and composer, to whom I ventured—in ignorance of its author—to suggest as much, did not prolong the conversation on that point.

Dancing and riding parties were in the meantime available for all such of us as cared for these amusements, and nothing could exceed the generous hospitality proffered to all in the ship during our stay. A levée was held at the palace, at which the officers of the *Chalenger* and those attending were duly presented to the king, in the orthodox fashion, by the British minister. During the ceremony, his Majesty appeared in plain morning dress, wearing the star of Kamehameha, and stood near the throne, on which was placed the

robe of state, a souvenir of former greatness, made from the feathers of a small bird, and of great value, from the fact that only two yellow feathers are available from each bird. The robe is 6 feet long, and 7 feet broad, beautifully made, but requiring generations to complete.

A day was named by the king for a return visit to the ship, on which occasion his Majesty embarked from the jetty stairs in the *Challenger's* barge, attended by a brilliant staff of Governors, ministers, and Court dignitaries in gay uniforms, with plumes, epaulettes, and gold-lace. On their arrival on board, the royal standard was loosed at the main, the ship's company manned yards, and the band struck up the Hawaiian national anthem. Some hours were spent on board seeing the wonders, and all the party entered more or less fully into the details of our scientific doings.

Amongst the staff was one, who, perhaps, I may single out as an extraordinary specimen of humanity—an American by birth, in tail coat, adorned with the large star of the order of Kamehameha, which is worn by the Cabinet, a white hat with the "nap," brushed the reverse way, and a shirt-collar reaching halfway up his ears. Such was his Excellency the A—— G——. He was affable in the extreme, and showed a predilection for strong drinks, that left his colleagues nowhere in a very short time. Desirous of making a speech in the ward room, he was with difficulty restrained, and on taking his leave the grace of his movements, the lowness of his salutation and bow, and the general urbanity of his manners, impressed us all with the idea that he had long been accustomed to the genuflection and etiquette of a Royal courtier.

The end must come of all good things, and after a stay of a fortnight at Honolulu, a start was made for Hawaii, the birth-place of the great volcano. Besides, the "season" was over, and Royalty had already left the capital, accompanied by his royal Consort, Queen Kaprolani; the cortège left the palace and drove down to the small steamer in a neat pony carriage, with a "tiger" in black and green livery. The attendants whom the king delighteth to honour followed in a more showy waggonette, and the exit of the royal court took place with due honours from the foreign ships of war in port.

August 11.—This morning all was ready, and with much regret we left the hospitable shores of Oahu, and steamed out through the passage of the coral reefs.

Some hours were afterwards spent in swinging ship, both for azimuth and magnetic corrections. Finally we proceeded on our way for Hilo, steaming on over the golden tropical sea, and before

sunset these beautiful islands had sunk below the horizon. A strong head-wind unfortunately sprang up, and very soon we were lurching and tumbling about in the open channel separating Oahu from Hawaii.

After three days of this squally, boisterous weather, land was again in sight; and as we neared it, we could see a pretty coastline of grey cliff, many hundred feet in height, draped with green, showing out here and there masses of black volcanic rock. Into cracks and caverns the heavy waves surged, sending the spray high up amongst the ferns and trailers.

On the summits of these cliffs were dense forests of the ohia, koa, ieie, mamane, mamaki, alii, and many other trees, crowded together and sheltering an almost endless variety of ferns and shrubs, encircling Mauna Loa and Mauna Kea, two vast volcanic mountains, whose snow-capped peaks rise to nearly 14,000 feet.

We pass on, catching glimpses of native churches, villages, and sugar-plantations, their bright green vegetation looking most charming.

August 14.—Later in the day, we arrived and anchored in Byron's or Hilo Bay, a pretty crescent-shaped sheet of water, fringed all round the shore with cocoa-palms and other tropical foliage.

Hilo looks very pretty from the anchorage; its bay, said to be one of the most beautiful in the Pacific, is a semicircle of about two miles in extent; the native houses are half-hidden by tall trees that spread their foliage about in all directions; and near the landing-place some white frame-houses and three church-spires are prominently seen.

Soon after our arrival I landed (not for the first time, for I was here in 1858) at a small pier run out through the surf for the convenience of passengers landing from the coasting steamer *Kilauea*.

Roads branch off in several directions; that along the beach contains a few frame-houses, in which apparently all the business of the island is done. Another road passes the three churches, the most prominent of which is the Roman Catholic, with its two towers. A native church is next; and then a small one for the foreign residents.

The Court House, a large wooden building, with verandahs, surrounded by beautiful exotic trees, is the most imposing building on the island. Go where one will, in either direction, are great varieties of houses; for the foreigners have all seemingly carried out their own individual tastes in their dwellings, and the results are very pleasing and agreeable, although for picturesqueness they

must yield the palm to the native houses, which, whether built of wood or grass, plain or plaited, whether of one or two stories, seemed so much more in harmony with their surroundings.

In nearly every instance these dwellings have a cool and prepossessing appearance, with their deep-thatched roofs and verandahs fantastically latticed and screened with gorgeous trailers of jessamine, clematis, and the gorgeous passion-flower. Passing along here leads one to the Anuenue, or Rainbow Falls. The track is a scramble among rocks and holes concealed by grass and ferns, with several small streams to cross. The fall itself is four or five miles off, but the sight is well worth all the trouble taken to reach it: it is a broad stream of water rushing on from the high land, forming on its way numerous delicious and cool bathing-places, until, reaching a precipice of about 100 feet, it falls into a basin with a deep cavern behind, surrounded by beautiful ferns and a jungle of tropical shrubs of great variety. To this spot many made their daily visits, not only for the pleasure of bathing, but to enjoy the delightful scenery in every direction. The principal object of our visit to Hilo was that opportunities might be afforded to those who desired to visit the celebrated Crater of Kilauea. A day or two after our arrival horses and guides were provided, and a large party started to do the thirty miles of rough road leading to the shrine of "Pepe," the home of the dreaded goddess of volcanoes. The weather was fine, and all started from Hilo in the best of spirits, well mounted on sure-footed horses, and in this way for some miles proceeded in single file along narrow roads of hard lava rock, about a couple of feet wide, occasionally passing through forests of true tropical jungle, where Nature seemed to riot in the production of strange and curious forms; where trees have grown and fallen, and a new vegetation has sprung up over them as they lie, altogether obliterating any signs of decay.

Thus all went on for miles; in fact, the whole track is a perpetual upward scramble, rough and rugged in the extreme; for though the ascent is gradual, so that it is only by the increasing coldness of the atmosphere that the elevation is detected, it is really a rise of 4000 feet in the thirty miles. The halfway house (just a rough grass native shanty) was reached in due course, and here a short stay was made for rest and refreshment, after which we started on again, all being anxious to reach the crater before night set in. Continuing our journey, the country altering but little in appearance except that, perhaps, the trees appeared of more sombre aspect, all at once, on emerging from a dense forest, a glare, brighter and redder than from any furnace, suddenly brightened up the

whole sky. The heavens became brilliant, and when the Volcano House (a small hotel) was reached, clouds of red vapour, mixed with flame, were curling ceaselessly out of a large invisible pit of darkness, and Kilauea was in all its fiery glory: we had reached the crater of the largest volcano in the world.

We took up our quarters at the Volcano Hotel, a long building, constructed of grass and bamboo, which all thought very comfortable after the long and wearying journey. Here a good dinner was ordered, and during its preparation it was cheerful to sit round the great wood fire, for the night was somewhat cool at this altitude.

After rest and a refreshing dinner all set off to see the sights; not far to go at first, for the mighty crater is situated only a short distance from our house. The abyss, which is at a height of 4000 feet, on the side of Mauna Loa, has the appearance of a large pit, and is estimated to be nine miles in circumference. The guides informed us that there was nothing to fear; the edge of the crater was approachable with safety, except during an eruption. After an hour of very difficult climbing and scrambling, the lowest level of the crater was reached. My highest expectations were more than realised, and I can hardly find words suitable to describe my sensations after seeing such a spectacle. All was confusion and commotion; for the lava, like red-hot metal, broke about with a surging noise on the rough craggy cliffs, cooling as it fell over the edge, where it hung in festoons. With all this, I noticed but little smoke or vapour, and what there was seemed carried away by a light breeze.

Here we remained for a long time, so engrossed by the grand spectacle, that when it was decided to return, by some means we got on the wrong track, and were for more than an hour seeking the right road: however, eventually we reached the hotel, nearly tired out.

Kilauea never overflows its vast crater, but appears to burst a passage for its lava through the mountain-side when relief is necessary, and then the destruction is usually fearful. Fortunately this seldom occurs, for it is many years ago that so great an eruption took place; then it rent its stomach, and sent a broad river of fire careening down to the sea, sweeping away forests, huts, plantations, and everything else that lay in its path. The last eruption occurred in April 1868; it was accompanied by fearful earthquakes, and was more destructive to life and property than any previous one.

After spending the night at the Volcano Hotel, the next morning we left Kilauea in a heavy rain-storm, which lasted, with but

little intermission, nearly all the way back. * * * In the evening we straggled into Hilo, thoroughly tired, still greatly pleased and delighted with the trip. A few days longer here, and preparations were made for leaving. On the 19th August all was complete, and we steamed out clear of the land on a southerly course, and ere nightfall the coast of Hawaii had faded from our sight.



NATIVE BAMBOO HOUSE, TAHITI, SOCIETY ISLANDS.

CHAPTER XVI.

SANDWICH ISLANDS TO SOCIETY ISLANDS.

Leave Hawaii, Sandwich Islands—Passage to the Society Islands—Sounding and trawling—Death of Dr. von Willemoes-Suhm—Biographical sketch—Burial at sea—Tahiti in sight—Sounding and dredging outside the reefs—Anchor in Papeite Harbour—The town and country—Streets and natives—*Challenger's* band on shore—Queen Pomare and suite's visit to the *Challenger*—Afternoon dance—Ride to Point Venus—The Broom Road—Charming scenes—Natives met on the road—Tamarind tree at Point Venus—Waterfall—Hill fort of Fatauna—Fruits and plants—Alongside Fare Ute—Coaling from the French depot—A day outside the reefs—Dredging—The company on board—Swing ship.

THE run of 2400 miles to Tahiti (Society Islands) was of a very dull and monotonous character. Soundings were obtained on seventeen occasions, and dredging was frequently carried out. The average depth found was 2800 fathoms, and the bottom composed of a red or chocolate-brown clay, and occasionally large quantities

of black manganese. Nothing new or important was obtained in the trawl; so the additions to the natural history collection were somewhat small.

September 13.—It has been a painful day for us on board; the fell destroyer has again visited the ship, and struck down in the midst of a life in which he was striving to do good, one of our shipmates. Dr. Rudolf von Willemöes-Suhm* passed away this afternoon from the scenes of his labours to, let us hope, a haven of rest. Attacked by erysipelas a few days since, serious symptoms showed themselves, and the strength of his youth—he was only 28—was not enough to battle against the exhaustion of the fever. His death has not only left a blank in our small circle, but will cause a void in the higher scientific life of Germany. During the time he has been associated with the scientific department of the Expedition, he entered most fully into all its details, and mastered some of its most difficult subjects, and his loss therefore was much felt.

September 14.—Our late shipmate lies to-day in 2700 fathoms, in lat. $11^{\circ} 15'$ south, long. $150^{\circ} 30'$ west, 300 miles from Tahiti. Head winds and calms succeeded each other as we passed on through the Tropics.

At length, on the morning of the 18th September, we came in sight of Tahiti and the outlying island of Morea, and, as we neared, could be seen very plainly the singular zigzag outline, precipitous crags, and crater-like depressions, of every shade of blue, grey, and purple, broken into every conceivable fantastic shape, with deep, dark, mysterious gorges, showing almost black by contrast with the surrounding brightness; while in the foreground, stretching away

* The following biographical sketch appeared in *Nature*:—

"Dr. von Willemöes-Suhm died near Tahiti on the 13th September, and the expedition thus lost one of its most valued members.

"He was a native of Schleswig-Holstein, and studied in the universities of Göttingen and Bonn. He showed at a very early period a strong taste for natural science, and shortly after the conclusion of his studies he was appointed Privat-Docent in Zoology in the University of Munich. This appointment he held at the time of his death, having obtained leave of absence to join the *Challenger* expedition. He has published many valuable papers, chiefly on the structure and physiology of invertebrate animals. He devoted himself with the utmost earnestness to the work of the expedition, and in addition to several important communications to the scientific societies, he leaves behind him a fine series of drawings and a great amount of material, which must now be worked out by other hands."

from the base to the shore, is a forest of tropical trees, with the huts and houses of the town peeping out between them.

Some hours were spent outside the reefs in sounding and dredging, in a depth of 1525 fathoms, but not much of interest obtained; it was near 4 P.M. before we entered the lovely harbour of Papeite, which is surrounded by coral reefs, forming a most safe and pleasant haven of rest after the thirty days at sea. Of all the innumerable islands of the vast Pacific, there is none which has at various periods attracted the attention of the civilized world in the same degree as that in whose harbour we are now at anchor. At first, it was from the pleasing description given by Captain Cook of his stay here; then the events connected with the mutiny of the *Bounty*; and still later, by occurrences of a political nature, which resulted in the French Government taking possession and establishing a Protectorate. So far back as 1838, the French Government commenced hostilities against the rulers of this group from some fancied insult to their flag and alleged ill-treatment to their missionaries, for which an indemnity was demanded. Under pressure, Queen Pomare signed a treaty with France, and afterwards she was induced to forward an application to be received under French protection. Previous to this the people had been under English influence, and "Bretane" (Britain), King George, and everything English had become the objects of the esteem and love of the natives, a feeling which even now exists. I have spent many a half hour answering questions as to Victoria, "Alfreda"—the Duke visited Tahiti in the *Galatea*—Prince of Wales, and Alexandra, &c.; and on leaving Tahiti I had more than one message of love and remembrance entrusted to me to deliver to Victoria when next I saw her. From this date up to the present matters have been going from bad to worse, and now under the Protectorate, although the Queen is allowed 1000*l.* per annum, she is subjected to all sorts of annoyances, and even personal indignities at times, and so strict is the line drawn by the Governor, that a proposed visit in the *Challenger* to Morea, with some members of the royal family and Queen Moe, was given up for fear of opposition by the French authorities, on the plea that, holding the position they did, they could only go there in a French ship.

Although the French now hold so much authority in the islands, they were not quietly allowed to assume it, and numerous conflicts occurred with the natives, inimical both to the Queen and her new advisers. The last fight occurred in 1845, at the fort in the valley of Fatahana, and since that date Tahitian independence has been a thing of the past. The height of the commercial prosperity of

Tahiti appears to have been under the Empire in 1862-63 and the succeeding years. Of the available acreage cleared for cultivation in that year, 3000 acres were prepared for bearing crops, without including the 8000 acres belonging to the Tahiti Cotton and Coffee Plantation Company, at "Terra Eugénie," or Atimano, of which nearly three-fourths in 1865 were cleared and sown. The value of the exports of the production of the island—native produce only—for the four years from 1859 to 1862 amounted to 91,900*l.* and this was increasing. Agricultural exhibitions, at which many prizes were given to native cultivators, were held in 1862-63, and there seemed a future for Tahiti, the Empire being willing to pay for the prestige of its flag and its possessions in the Pacific.

"Nous avons changé tout cela," and to-day Tahiti is to pay its own expenses. An *ad valorem* duty of 12 per cent. and countless restrictions on trade, help to this end; but the plantations are returning to their natural state, and the trade—what is left of it—is in the hands of the foreigner.

Papeite lies at the end of a semicircular bay, seven miles west of Point Venus, the northernmost part of the island. It is the chief town, the residence of the Queen, and seat of government; but this is not incompatible with its being of very limited dimensions, not rising above the grandeur of an ordinary English village.

The dwellings of the Europeans, constructed for the most part of wood, roofed with palm leaves, extend all along the edge of the bay, while diverging or running at right angles or parallel are pretty roads, which help to make regular streets, around which, and on every side, rise up bread-fruit, cocoa, palm, and orange trees, which make up in cheerfulness for any deficiency in aspect.

On landing, almost the first person met was a tall, fine-looking Englishman, Major H., another of the wanderers of the world. Major in a West India regiment, gold-digger in Australia, policeman and what-not in New Zealand. Wrecked amongst the Fiji islands, he eventually turns up and settles at Tahiti as superintendent under Stewart, the manager of the Tahiti Cotton and Coffee Plantation Company, which I shall speak of further on. On the death of the manager, and bankruptcy of the company, the major, thrown on his own resources, started an ice-house and hotel, to which he has recently added an ice machine. In this position we find him trying to make a livelihood. It was amusing to note the remnant of pride when the major asked any of us to dine with him—at one's own expense, *bien entendu*. Building castles in the air of the success of the ice machine, and the possible fortune to accrue from it, he hoped yet for a brilliant future. Still

the major was a capital companion, and a ready handbook of the history of Tahiti. We hope with him that all his anticipations will be realised.

The streets of an evening, the lighted shops and stores surrounded by the beautiful trees and gaily dressed girls, the rollicking "blue-jackets" from the two French war-ships in port and from the *Challenger*, the universal good-humour of every one, made a very novel, picturesque, and pleasing scene.

My first evening on land I spent with others in a ramble through some of the most beautiful shady avenues, following the stream of pedestrians (everybody seemed to be out in holiday attire, for, in addition to gangs of sailors, there were French soldiers, gendarmes, native girls and men), all strolling on in the best of spirits, reckless, happy, and good-tempered. At length, on reaching the Queen's Square, in which the amateur band of the *Challenger* was advertised to play, the strange, motley scene that burst on us was altogether indescribable.

All shades of beauty were here represented, from the swarthy Tahitian to the fair-skinned European; all, however, dressed much alike, in long, loose, cool-looking drapery, consisting of a sleeved garment, falling in ample and unconfined folds from shoulder to feet, of all hues, shades, and colours; their luxuriant tresses set off by brilliant flowers and masses of snowy *reva-reva*, a gauzy white material, looking like strips of silver paper (made from the shoots of young cocoa-nut trees). French officers, naval and military, in gay uniforms, with white, brown and pretty half-caste ladies; several of the *Challenger's* officers, and numerous civilians from far and near, helped to fill in the large space. The music was enjoyable in the cool still night; and it was pleasant to wander about amongst the merry crowd, speaking freely and sociably to anybody we pleased without fear of giving offence; threading our way amongst the numerous parties seated about, interchanging jokes and compliments, or squatting down amongst a lot of lively native girls on their outspread mats, and carrying on a broken sort of conversation with them—all generally so good-humoured and merry that they could not fail to win one's esteem.

All appeared thoroughly to enjoy the music, and to regret when the programme came to an end with the "Marseillaise;" mats, bundles, and babies were gathered up, and the crowd, in a short time, dispersed to their various homes.

A *levée* was held at the palace, at which the officers of the *Challenger* were presented to royalty in due form. And (on the 1st October) a return visit was made by the Queen; on which

occasion the opportunity was taken to entertain her Majesty at a ball on board. The quarter-deck was prettily decorated with flags, trophies, and flowers; and as there were several princes and princesses present, together with the French Governor and staff, the party was a gay and merry one.

During our stay here excursions were planned to various parts of the island; amongst them, that made to Point Venus had a double interest attached to it. It was on this promontory that Captain Cook first made the astronomical observation by which he determined the correct position of the island, and in 1769, from here, he, with a scientific party, observed the transit of Venus.

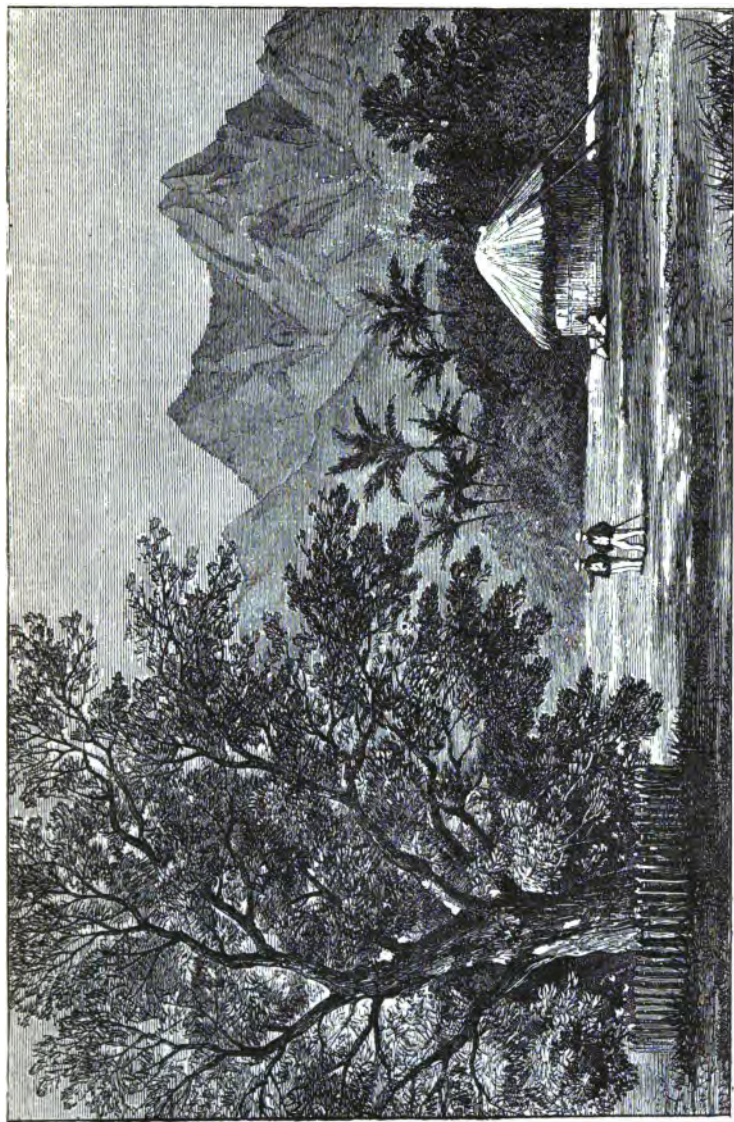
The ride thither lay through delicious groves of cocoa-palm and breadfruit trees, mingled here and there with citron, orange, bananas, and guavas. The tree-like oleander and beautiful red-flowered hibiscus towered above all, bright and blooming; the entire scene being one not easily forgotten.

The Broom Road (as it is named) ran on thus for a long way parallel with the shore, taking us under the shade of charming trees, and across innumerable little streams, where were seen numbers of native girls either bathing or washing their garments; and occasionally on the way meeting many of the men in their clean white shirts and parti-coloured waist-cloths; each, on passing, greeting us with a cheerful smile and a hearty "Ya rana," which means all kinds of salutations and blessings; sometimes even stopping and shaking hands, with no other earthly object but kindly fellowship.

The scenery, look where one would, was exceedingly pretty. Wherever there was a break in the glorious tropical foliage could be seen either precipitous mountains, clad in refreshing green, and cleft by deep, cool gorges, or the fine sweep of the ocean, a brilliant, transparent blue, bound and bordered by a long white line of foamy surf dashing against the reefs.

For some miles the road ran on, intersected occasionally with charming little villages, with houses, cool and comfortable, built of hibiscus or bamboo poles, fixed in the ground a few inches apart, giving them the appearance of enormous bird-cages. The roofs are overhanging, and ingeniously constructed of plaited palm leaves. At Point Venus is a lighthouse, with a flashing light visible for 14 miles, and close at hand is still to be seen the tamarind tree planted by Captain Cook near the spot where he completed those renowned labours which still single him out as the greatest of Pacific discoverers.

Another agreeable excursion was one taken to the beautifully



TAMARIND TREE, PLANTED BY CAPTAIN COOK, AT VENUS POINT, TAHITI.



situated hill-fort of Fatauna—renowned in the annals of the country—which well repays the trouble of reaching it.

The road lay through guava fields and sugar plantations, and delightfully cool and shady forests, until reaching one of the most important waterfalls in the island, where a broad sheet of water is seen leaping over a perpendicular precipice nearly 700 feet high, falling into a huge basin some 1500 feet above the level of the sea.

The history of the plantations at Atimano is singular and suggestive. Their originator was an ex-cavalry officer, Stewart by name, who for some years held an autocratic authority over more than a thousand people, and who has inseparably woven his name into the history of Tahiti, between 1860–70. Leaving Australia for his own good, we next hear of Mr. Stewart turning up at Tahiti, where, after scheming for some time, he managed to obtain a written authority from the French Governor to acquire property on the island with a view to the development of its resources. Armed with this document, he succeeded in England in forming a Polynesian Land Company, and returning to Tahiti with the money of his dupes, found that the acquisition of land under the French authority was contrary to the terms of the Protectorate, although no obstacle was put in his way in endeavouring to purchase land from the natives. A large tract of land, under the title of Terra Eugénie, was somehow brought under his control at Atimano, and a pseudo-transfer of shares took place to the Tahiti Cotton and Coffee Plantation Company (Limited). Of this company Stewart was appointed manager. That he was clever and born to command men there can be no doubt, and that his views were large and extended there is also evidence. Fine residences, a country house, hotels, hospitals, capital roads, and a host of improvements arose like magic at Atimano, and the hospitality and *bonhomie* of the manager of the plantation became household words. Sending to China for coolies was a mere secondary operation, and in 1867 there were no less than 916 Chinese and 323 Polynesian labourers, including 108 women, employed at Terra Eugénie.

It was very easy to spend capital, and in this instance it was royally done—until the day of reckoning came. The title-deeds of the estate not being forthcoming, the shareholders of the company became alarmed, and the manager, from chagrin, sickness, and the effects of drink, passed away in 1874, the whole affair collapsing shortly afterwards.

The houses are falling into decay, the estate is again a wild and desolate plain, and a purchaser cannot be found for what, under

proper and judicious management, might have proved a source of profit to its owners, and of immense advantage to the natives of the island.

The naturalists and others took every opportunity of becoming acquainted with the productions, soil, climate, and inhabitants. The natives (that is, those living away from the town and European influences) are found to be of the same indolent nature which characterises all those met with amongst the South Sea Islands, having but few wants, and those easily supplied; for bananas, bread-fruit, oranges, pine-apples, and fais (a sort of wild plantain) grow luxuriantly in all directions. All around are picturesque and rugged hills, imparting a beauty to the scene which cannot fail to arrest one's attention; while in close proximity, yet separated from each other by deep dark gorges, showing up their precipitous and inaccessible sides, are great crags, almost entirely overgrown with the guava (a plant which was first imported from South America, in 1815, by an American missionary, and which has since increased at so rapid a rate as to extend over some of the loveliest spots in the island). The "Diadem," a name given to several peaks which have a striking resemblance to a crown, displays itself from this point in all its wondrous loveliness; and away in the distance are still more and more lofty mountains, 6000 or 7000 feet high, which probably have never yet been trod by the foot of the naturalist.

All visitors unite in praise of the beautiful appearance of Tahiti, and speak of the climate as being uncommonly delightful and salubrious. It is moderated by sea and land breezes; this, combined with the fertility of the soil, makes it perfectly evident that almost every tropical plant may be extensively cultivated with but little labour. As it is, the sugar-cane, coffee-tree, cotton-shrub, the vanilla, cocoa plant, indigo, rice, and maize are produced; while of fruits, the banana, bread-fruit, mango, pine-apple, papaya, cocoa-nut, pandanus, orange, lemon, custard-apple, guava, &c., are plentiful.

On the morning of September 27th the vessel warped alongside the promontory of Fare Ute, where the French Government have what they designate an "arsenal," if a few rickety sheds, a blacksmith's shop, and a patent slip (for hauling small vessels up for repairs) can be so considered. However, such as it was, we were enabled to fill up with coal, and soon all was ready for sea.

A day was spent outside the reefs dredging amongst the corals, on which occasion we had a small party of ladies, &c., amongst whom were included Moa, Queen of Raiatea, Maru, Princess Royal of

Tabiti, the Chieftess of Morea (Mrs. Brander), and others. Of the gentlemen, the most distinguished was the King of Raiatea. The trade-wind was blowing very strongly outside, and a rough and squally day was the result; so there was but little enjoyment for the ladies, who were, after all, far better pleased when, in the evening, the vessel again anchored inside the reefs.

The next day swung ship for azimuth and magnetic corrections.



CUSTOMS GUARD HOUSE, VALPARAISO, CHILL.

CHAPTER XVII.

SOCIETY ISLANDS TO JUAN FERNANDEZ AND VALPARAISO (CHILI).

Leave Tahiti—Parting scenes—Westerly winds—Sounding and trawling—Juan Fernandez in sight—Picturesque scenery—Robinson Crusoe—Anchor in Cumberland Bay—The tablet at Crusoe's look-out—The Settlement past and present—Leave Juan Fernandez—The run to Valparaiso—Arrival, and anchor off the city—The city and harbour—Swinging ship for magnetic corrections.

ALAS! when a few short days of pleasure were passed, the hour arrived for our sailing, and on Sunday, October 3rd, the ship steamed away from Papeite followed by the regrets and good wishes of the best of the people. And thus we bade farewell to the fair islands of the Pacific, with the varied natural beauties which Nature has bestowed upon them with a lavish hand, and with the soft-skinned, indolent, happy people, children in everything except love and kindness, living, except when influenced for the worse by their so-called civilized brothers—as a rule the outcasts of Europe and America—contented with their lot, and ignorant of the curses of drink and disease, and the thousand and one evils which attend the footsteps of civilisation, and

form indeed the fire by which the heathen is tried, and through which it would seem he must pass to arrive at the benefits undoubtedly conferred upon him by Christianity.

October 3.—This morning the *Challenger* steamed out clear of the reefs, and we had our parting view of Papeite. When a good offing had been made, steam was dispensed with, and, with a favouring breeze, a course was shaped south-east, and beautiful Tahiti, with its imposing and irregular outline of hills, and rich vegetation, was soon left behind us, like a shadowy vision of dream-land; and all seemed to promise a speedy run over the solitary waste of waters intervening in the 5000 miles between Tahiti and Valparaiso.

Soundings and trawlings commenced within a day of leaving the shore; bottom found at 2050 and 1940 fathoms. On the 6th the trawl would seem to have invaded the cemetery or nursery ground—the professor says the latter—of the sharks, for, from a depth of 2385 fathoms, many hundred sharks' teeth, some embedded in manganese, others free from foreign matter and of different sizes, came up from the bottom; the largest tooth was 4 inches across the base, and the same length. What a monster it once belonged to! On the 7th we sighted Tubai Island, one of the cluster of the same name. We made no stay here, and, carrying a steady fair wind, it soon passed out of sight. Three days later the cape pigeons, petrels, and Mother Carey's chicken made their appearance, and this morning our old friend the southern white albatross reported himself and joined company.

On an Atlantic bottom of globigerina ooze, the trawl rope parted and several hundred fathoms went to the bottom. On the 14th the nature of the bottom was found to have again changed to manganese and sharks' teeth, to which were added bones of whales, &c.

October 26.—At last one is beginning to recover his equanimity of temper and equilibrium of body; the first was sorely tried from the 14th to the 23rd. A long calm, with a very high barometer, arrived, to add another instance of the mutability of human affairs. The passage was to have been a quick one, and Valparaiso reached about the first week in November. The expected fair winds had headed us, and we were compelled to run as far south as latitude 40° 8' south, when we crossed the parallel of the roaring forties, at a distance of nearly 3000 miles from our destination. The westerlies carried us over a rough, turbulent sea, until reaching latitude 39° 22' south, longitude 98° 46' west, when we again had to endure calms and baffling light winds, during which, opportunities were embraced for trawling. On the 29th, under 2000 miles from port,

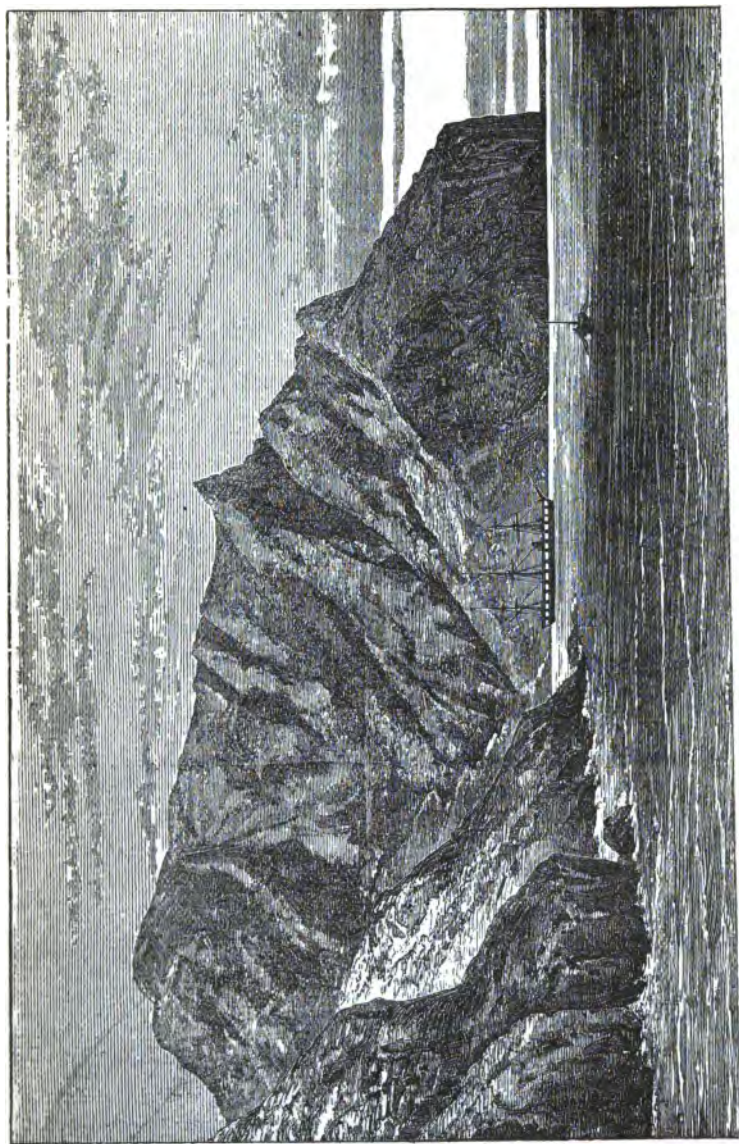
sounded, and, to the surprise of the staff, the depth was found to be only 1575 fathoms. An interesting rise on which we must dredge, so over went the trawl. But, either sulky or in good quarters, it refused after all to leave the bottom, and 1600 fathoms of rope kept it company.

November 5.—Still amongst the manganese, and at work from a depth of 1500 fathoms, the trawl's contents rewarding our labours with one specimen of a fish, about five inches long, of a uniform black colour, a new species, and probably a new genus. On the 8th a breeze sprang up, but it was of short duration, and the remainder of the distance until sighting the island of Juan Fernandez was performed under steam.

Thus nearly six weeks passed, during which soundings were obtained on twenty different occasions, showing an average of 2160 fathoms (the least being 1500, and greatest depth 2600 fathoms). Dredging was successfully carried out at intervals; the bottom was found to consist for the most part of a chocolate-coloured mud. Large quantities of manganese nodules, and on two or three occasions quantities of sharks' teeth, were brought up in the trawl.

Through a succession of unfavourable winds causing us to run so far to the southward of our course, the change of temperature was much felt; for having been so long accustomed to the warm, smiling tropical skies, the dull and overcast weather, the low temperature, and frequent rains seemed to be doubly cold and gloomy.

November 13.—A thousand miles north had to be run when land was reported—the solitary island of Juan Fernandez. The morning was fine, and I think I may say I have never seen a more remarkable and picturesque view than the approach to the anchorage presented. Great mountains appear, torn and broken into every conceivable fantastic shape, with deep ravines, through which the torrents at times sweep down from the precipitous cliffs, which rise one above the other, finally culminating in a great mass 3000 feet high, known as the Yunque, or Anvil (from its resemblance to the iron block used by blacksmiths). This is wooded nearly from the summit to the base, where are indications of its having been at one time cleared for cultivation (at the time probably when the Spaniards made the attempt to colonise it), for the stone walls which served to divide the inclosures still remain. There are also the remains of a fort, named San Juan Bautista, and a few tumble-down shanties, in which some forty or fifty people are existing, seeking a precarious living by supplying vessels that occasionally call here with fresh provisions, &c. It is certainly a strange fact that people can be



THE "CHALLENGER" IN CUMBERLAND BAY, JUAN FERNANDEZ.



found to isolate themselves in such out-of-the-way places as this. Doubtless, in the abstract, it is a fine thing to be monarch of all one surveys; but those who have realised it are generally found to reverse their early aspirations, and own that solitude is not good for mankind. It was on this island that Alexander Selkirk was landed in 1704, from a ship he was serving in at the time as master; and here he remained in solitude for more than four years. Eventually, on being rescued, and returning to England, he gave the narrative of his sojourn here to the great romancer of his day, Daniel Defoe, in order to prepare it for publication; and it was from the ideas so furnished that the excellent and well-known story of 'Robinson Crusoe' was formed.

Anchoring in Cumberland Bay, in 40 fathoms, not far from the shore, we found it quite safe and pleasant. The bay has much the appearance of a huge crater of an old volcano, surrounded on all sides, except one (the entrance), with high precipitous cliffs, which are torn up into deep ravines and valleys. Here, at anchor, a couple of days were spent, and in the brief time permitted the most was made of it. All the places near at hand immortalised by Selkirk were visited—the "caves," his "huts," and "look-out" (a gap some 2000 feet above the level of the sea), where a glorious view, both north and south, was obtained. Here H.M.S. *Topaze*, in 1868, placed an iron tablet, with the following inscription:—

In Memory of
ALEXANDER SELKIRK, MARINER,
A native of Largo, in the County of Fife, Scotland,
Who was on this Island in complete solitude
for four years and four months.
He was landed from the *Cinque Ports* galley, 96 tons,
16 guns, A.D. 1704, and was taken off in the
Duke privateer, 12 Feb. 1709.
He died Lieutenant of the *Weymouth*, A.D. 1723,
Aged 47 years.

—
This tablet is erected near Selkirk's look-out by
Commodore Powell and Officers of
H.M.S. *Topaze*, A.D. 1868.

Naturalists and others were busily engaged collecting birds and specimens, and a few photographs were obtained; and, what was

very acceptable after the long voyage, plenty of fresh food, for the bay proved a most prolific fishing-ground, and from the settlers, beef, &c., of excellent quality was supplied.

The island is only some ten or twelve miles long, by four broad. The shore is formed by a steep, dark bare rock, rising up some 800 or 900 feet, through which wild ravines run, giving here and there views of grassy plains and verdant valleys of considerable extent, thickly wooded with a luxuriant foliage of great variety, amongst which were noticeable great numbers of peach trees, which are said to have been planted by Lord Anson in 1741, when on his famous voyage round the world. Figs, strawberries, and cherries are also obtainable in their seasons. Twenty-four varieties of ferns were found by the collectors, and myrtle trees abound in great numbers over the island.

Since the discovery of the island in 1563 it has been the scene of many vicissitudes. At first it was much visited by the old buccaneers, when on their marauding expeditions against the Spaniards; and during one of these visits, in 1681, a negro (from the West Indies) belonging to one of the vessels was accidentally left behind, and remained in solitude for three years until rescued. Twenty years after this (1704) we hear of Selkirk's solitary life, and of several others, each of whom has at times been the solitary inhabitant of Juan Fernandez, which seems to entitle the island to be called the land of Robinson Crusoe. In 1717 the Spanish Government, jealous of other nations coming here, established a colony; but it was soon after almost totally destroyed by a dreadful earthquake, a calamity the island has been subject to on more than one occasion since. In 1810, when the Chilians gained their independence, this island formed a part of their possessions; and in 1819 they formed it into a penal settlement, and have had as many as five hundred prisoners at a time here. But it was found expensive; and in 1835 the prisoners mutinied, and for a short time overcame the troops. After this the convicts were removed to the mainland, and the island was again deserted, and so remained for some forty years. At the present time it is leased to a Chilian merchant, who employs all the settlers in cutting wood, tending cattle, &c., and during the season seal-hunting, both here and at Masafuera, 90 miles distant, when they usually capture some two thousand, the skins of which are at present worth \$16 each. The climate is mild, and considered healthy; but the weather is subject to great changes. During our stay the mornings were generally cloudy, with showers of rain; towards noon it cleared, and for the remainder of the day it was usually fine and pleasant.

On the evening of the 15th November we left Cumberland Bay, steaming out clear of the headlands, when a sail was made, and the 360 miles separating us from Valparaiso were expected to be soon got over; but rough seas and head-winds delayed, and made a long passage. It was not until the morning of the 19th November that land was in sight, and as the haze cleared, it proved to be the faint outline of Aconcagua, the highest of the Chilean Andes. A few hours later we made the lighthouse on the southern part of the bay. It was a pleasant sight on approaching the anchorage, which was full of shipping; and the appearance of the city to us, just come in from the turbulent sea, was very charming; the buildings extend along, row after row, for a considerable distance in front of the bay, and surmount the hillocks which rise at short distances from the shore, forming the districts known to the sailors as the Fore, Main, and Mizen Top.

December 14.—I do not leave Valparaiso impressed with any vivid recollections of pleasant days, nor imbued with a desire to revisit it. The change from the brilliant foliage and ever-changing colours of the Pacific islands to the bleak, dreary-looking barren hills of Chili was not exhilarating after the first joy of touching dry land once more had passed away; looking at the shore from the ship in Valparaiso Bay, one's eye wandered from point to point of the hilly back-ground seeking for something green as a relief from the sandy red soil which seems everywhere present. Far away in the distance could be seen the great range of the Andes, snow-capped, and, in fine weather, standing out boldly against the blue atmosphere, which seemed to possess a clearness and intensity peculiar to itself, whilst the giant volcano of Aconcagua rose 23,000 feet from the sea-level and made its surrounding mountains look pigmies in its presence.

Valparaiso stands in one corner of a large semicircular deep-water bay, and whilst the town extends for over two miles along the shore, its breadth is in some places that of two streets only, and, except on the contour of the hillside, it rarely exceeds the space occupied by four or five streets.

The bay is open to the northward, and landing during a blow from that direction is often fraught with great danger.

Since the attack by the Spanish in 1866 every available point has been strongly fortified, and the presence of an ironclad, with the expected arrival of a second, leads to the conclusion that the Chileans will not again be caught unprepared.

On a hill, almost in the centre of the town, is a large cemetery and a pretty-looking Protestant church, and speaking plainly of the days of religious intolerance, when a wall twelve feet high was obliged to

be built around the place to prevent the contamination of the faithful.

On landing at the mole near the two floating docks, one passes into a square with a bronze monument in its centre, tardily erected to the brave old sailor, "Dundonald," and the names of Cochrane Street, Cochrane Hotel, &c., evince the awakened sense of the aid received by this country from the "old fire eater." In the square are some fine government buildings, including the Palace of the Intendente (or chief municipal authority), with some of the Spaniards' shots—from the bombardment—carefully painted, to indicate their position, embedded in its walls.

A tramway runs through the town, and the streets are kept clean and in good order. The business portion of the place is narrow for the amount of traffic, but this error has been avoided in the newly-built parts, where the streets are very broad, and some of the piles of buildings notably fine.

Everything about the town—the houses, shops, and population—has quite a European aspect; so that go where one would, through streets and squares, with their lofty edifices, gay hotels, and large and splendid stores, abounding in everything that can minister to human requirements and luxury (but I might add at a most exorbitant price), it required but little stretch of the imagination to fancy oneself in some European capital.

For a Catholic country the number of priests met with in the streets was small, whilst that of the police in the uniform of soldiers was larger than I have ever before noticed. These "limbs of the law" keep up an eternal whistling, as they saunter lazily along, thereby carefully warning any evil-doers of their approach. Every house has a flagstaff, and all the better-class buildings devices for gas illuminations in readiness for the official rejoicing days, or the many holidays to be found in their local calendar. A failure to aid in these demonstrations entails a fine.

The police regulations are severe, even punishing the second offence of dropping paper in the street. After dark no hired boats are allowed so leave the shore, and at and later than 9 P.M. a pass is necessary even to land, whilst to go afloat is almost impossible. The rule is, however, sometimes relaxed in favour of officers going to their vessels, and to boats from the war-ships in port. Another arrangement struck me as being novel: on the outbreak of a fire the owner of the house is at once taken in custody by the police, and so detained until proof that the fire was not the result of his carelessness is forthcoming.

The majority of the business men are English, American, or

German; here as elsewhere one hears the same story of dulness of trade and the approaching crisis in many houses, yet to me there were many signs of the reverse to be seen at least in the streets and shopwindows. From 7 to 9.30 p.m. is the fashionable time for promenading in the well-lighted streets, or listening to the music from military bands playing in the squares; the lovely nights and healthiness of the climate make the last enjoyment most pleasurable.

The number of ships, the greater part English, in the bay was large, and steamers were arriving and leaving almost daily for the coast-ports; in fact, Valparaiso is the busiest place we have seen since leaving Australia. Being a depot for the capital and principal inland towns, the import foreign trade is extensive. Even from Mendoza produce is brought on the backs of mules across the Andes to Santiago for the rail to Valparaiso, and the requirements for the chief inland towns of the Argentine Confederation are carried back by the same route and means to Mendoza.

The passes over the Andes were declared open during our stay, and two of the *Challenger's* officers recently promoted decided to reach England by that way, and, in company with the engineer of the projected Trans-Andean Railway, they left us one evening for Mendoza, which they hoped to reach by the Uspallata Pass, 12,500 feet high, in five days from Santiago. From Mendoza to Cordova the "diligence" is used, and from thence to Rosario the journey is by railway. On arriving at the latter place a two days' trip by steamer and Buenos Ayres is reached, and twelve hours later would land them at Monte Video; the whole journey was calculated to cost 150 dollars, and occupy about fourteen days. One of our naturalists reached the same pass in a six days' trip from the ship and brought back a large collection of plants for the Botanical Gardens at Kew.

Santiago was visited by several members of the expedition and all are unanimous in pronouncing it a splendid city, with public buildings and houses worthy of a European capital.

Of public buildings there are several; those of the Exchange and Custom House and Palace of Justice being the most extensive and commodious. Banks, theatres, masonic halls, and other edifices, are scattered over its length and breadth. It is in communication with Europe by submarine cable, and the numerous lines of mail-steamers, both *via* Panama and the Straits of Magellan, give great facilities to commerce, and increase its importance. Near at hand are numerous protective batteries, and on the heights are the artillery barracks, &c., from which point can be had a fine view over the city and its environs, hemmed in by the ocean. The roadstead resembles that of Bahia, and is about $2\frac{1}{2}$ miles wide and $1\frac{1}{2}$ mile deep, entirely

open to the north; and when strong weather from that quarter sets in, there is usually a very heavy sea, that occasions much mischief amongst the shipping, which are moored head and stern in pretty regular order, with the double object that in case of a sudden "norther" they may not suffer from dragging their anchors, and be able to slip their cables and proceed to sea at once.

After refitting and completing stores, on the 10th December the *Challenger* steamed from the anchorage, but in consequence of a strong northerly wind (very unusual during the summer), with thick weather and heavy rain, it was not possible to carry out any work for adjusting compasses, consequently, the ship anchored again the same evening; it moderated somewhat the following day, when we finally left for the Straits of Magellan.



MOUNTAINS AND GLACIERS IN MAGELLAN STRAITS.

CHAPTER XVIII.

VALPARAISO, THROUGH THE STRAITS OF MAGELLAN.

Leave Valparaiso—Sight Juan Fernandez—Sounding and dredging—Strong head-winds—Fall in with the westerlies—Sight Cape Gallagos and Cape Tres Montes—Anchor in Port Otway—The Entrance Islands—Last day of 1875—Leave Port Otway—Passing through the Messier Channel—Anchor in Hale Cove—The scenery—Foliage—Leave Hale Cove—Continuance of passage through the Messier Channel—Stop and trawl off Middle Island—The pretty scenery—Anchor in Gray Harbour—The excursions—Grass and trees on fire—The grand effect at night—Leave Gray Harbour—Messier Channel and Indian Reach—The English Narrows—Mid-Channel Island—Dredging off Saumaurez Island—Anchor in Port Grappler—The derelict *Karnack*—Weather during our stay—Leave Port Grappler—Pass through Wide Channel—Dredging, &c.—Anchor in Tom Bay—The excursionists—Squally weather—Drag our anchors—Leave Tom Bay—Conception Channel—Proposed survey in the Trinidad Channel frustrated through the weather—Pass through Conception Channel—Soundings, &c., in Innocent Channel—Anchor in Puerto Bueno Bay—Pretty scenes—The weather—Leaving Puerto Bueno Bay—The scenery and weather

in passing through Sarmiento Channel—Sounding and dredging—The Zach Peninsula—Anchor in Isthmus Bay—Leave Isthmus Bay—Passing through Mayne Channel and Smyth's Channel—Enter the Straits of Magellan—Cape Pillar in sight—Enter the picturesque Port of Churruca—The Glaciers—Leave Port Churruca—Pass through Crooked and English Reaches—Off Fortesque Bay—The Fuegians—Off Cape Froward—Anchor in Port Famine—The old Spanish settlement of 1581—The Chilian settlement of 1843—Leave Port Famine and arrive at Sandy Point—The Chilian settlement—Coal mines and gold workings—Leave Sandy Point and reach the anchorage off Elizabeth Island—Exploring parties—Finding fossil bones—Leave Elizabeth Island—Passing through the Second and First Narrows—Off Gregory Bay—Pass the meridian of Cape Horn—Again in the Atlantic—Pass Cape Virgin—Sounding and Trawling.

VALPARAISO TO PORT OTWAY.

At length all was ready, and on the morning of 11th December we took our departure, favoured with fine weather. On clearing the land, we made sail, and, with a promising breeze, there seemed good prospect that the 800 miles to the entrance to the straits would soon be accomplished, but we had reckoned without our host; strong southerly winds prevailed, causing us to run far to the westward. On the 17th sighted Juan Fernandez, when we dredged in 1375 fathoms with satisfactory results. For another week we continued on our cruise, frequently sounding and dredging from an average depth of 1600 fathoms, by which time we had run as far west as $89^{\circ} 25'$, when we fell in with the commencement of the westerlies, and were able to lay a course for our destination. On the morning of December 31st land was reported; amidst the haze and fog, Cape Gollagos was observed, a bold promontory rising from the waters; and somewhat later, on the mist clearing, Cape Tres Montes, a remarkable headland, was seen stretching before us to the height of 2000 feet. We stopped for a short time, and sounded and trawled in 1500 fathoms with good results, then proceeded for some fifteen miles, and came to anchor in Port Otway, a pretty, snug place, with a sandy beach, and several small islets covered with trees (the Entrance Islands), amongst which is the Logan Rock, strongly resembling the celebrated rock of that name on the coast of Cornwall. Luckily a fine sunset enabled all to enjoy the scene. The Sugar-loaf and a quaint-looking mountain, aptly called the "Dome of St. Paul's," 2284 feet in height, were in sight to the southward, while around us the still dark coloured water reflected a camera of

the surrounding land. The shores were too thickly wooded for any good walking, and time did not admit of a very prolonged search. Some beautiful ferns, mosses, and flowers were gathered, a few birds were shot, and a large quantity of capital mussels were procured. Here the last fleeting hours of 1875 were passed. We all sat up late, spending a jovial evening with the Captain and Professor, till the advent of the New Year, when, in conformity with an old custom (at the conclusion of the first watch, midnight), sixteen strokes of the bell were given—eight in honour of the departing year, and the same number in celebration of the birth of the new one.

PORT OTWAY TO HALE COVE.

January 1, 1876.—This morning at daylight we left Port Otway and steamed across the Gulf of Peñas, shaping a course for the Messier Channel. In the afternoon, whilst dredging in 125 fathoms, a number of explorers landed and wandered over the boggy ground. Some oyster-catchers, a large king-fisher, two or three cormorants, and some kelp geese were shot. The fuchsia was met with, growing wild and in profusion, and a handsome azalia-looking flower was abundant; the ferns, mosses and wild flowers were plentiful and wondrously pretty. The ship entered the Messier Channel about four o'clock, and soon after brought up for the night in Hale Cove, a charming little semicircular nook surrounded by high, steep hills, thickly covered with a scrubby vegetation. Immediately afterwards parties landed, and set out for a cruise in the vicinity of the anchorage. It was a perfectly still evening, and the scenery was exceedingly beautiful. The wooded hills bathed in sunlight, and the placid surface of the water, which reflected the clear blue sky, the delicate clouds, and the trees growing at the margin, made a charming picture. The vegetation consisted principally of winter's bark, evergreen birch, with ferns and mosses in profusion.

HALE COVE TO GRAY HARBOUR.

January 2.—Hale Cove was left at daylight, and the forenoon passed in steaming down the Messier Channel. When off Middle Island, where the ship stopped for a short time for sounding, we saw the first glacier, and during the afternoon, when we again proceeded, several more were seen, especially in Iceberg Sound, which afforded us a splendid picture of Antarctic scenery. Steaming for some hours, with the land, intersected with creek and gully, not more than a mile distant, on either hand several small blocks and

brash ice were passed, causing a fall of 16° in the temperature of the air.

A changing scene presented us at every bend of the channel and the perfectly calm surface of the water made the picture very charming. The mountains on either side rose high out of it, clothed with trees from the base to a height of upwards of 1000 feet, with here and there numerous cascades rushing down their sides, pouring their waters into the channel. It was a little before sunset when we anchored in Gray Harbour, a quiet, secluded spot. Here a second day was spent, and the weather continuing fine, it enhanced the beauty of the scenery, consisting of numerous small islands, and banks well wooded even to the water's edge, while behind high mountains rose, capped with large quantities of snow. Parties were speedily on shore with rifle and rod getting excellent sport, while for the botanist there were fine specimens of ferns, mosses, and plants in abundance.

Several afterwards extended their excursion to the head of a small lagoon in search of game, but, after a tiring walk through brushwood and bog, were sadly disappointed, for none was seen. The nature of the country in the vicinity of our landing effectually prevented any very extended search inland for geese, while the denseness of the bush, and the enormous undergrowth of moss in every direction, stopped any advance beyond a few hundred yards. Numerous parties had been gathering mussels along the shore during the day, and several fires had been lighted to "boil the pot." These fires by accident ignited the grass, and, spreading with great rapidity, before dark the hillside for several miles was in a blaze, sending up dense volumes of smoke, and clouding the atmosphere. The dry undergrowth burnt so quickly that it speedily communicated with the trees and foliage, and ere long fires were raging with great fury, sweeping up the valley and along the shore. At dinner, 6 p.m., we found that one of our shipmates was missing. Here was sufficient cause for alarm. He had landed to sketch on a peninsula abreast the ship, and had not been seen since 2 o'clock. The peninsula at this time was in a blaze in almost all directions, the pine trees burning with a great roar. Search parties were made up and sent on shore in different directions; the bugle sounded, rifles and guns were fired, and all imaginable steps taken to discover the missing one. A sprained ankle or other accident at such a time meant death, of that there could be little doubt. At dusk, when the blazes of the enormous fires lighted up the sky, all chances and hope were given up of seeing our shipmate. Fresh search parties in relays were organised, and luckily, at 9 p.m., our efforts were re-

warded, the "lost one's" voice was heard, and he was brought off, the crew cheering as he came alongside. At 11 P.M. all the parties had returned; no serious accident had occurred, and all was well again—the folly of landing alone in such a country is palpable. As the night advanced the whole bay was lighted by the fires, which extended nearly a thousand feet up the mountainside. It was altogether a grand sight—the roaring of the fires in the stillness of the night, and the bright glare illuminating the hilltops and placid waters of the harbour, having a very fine effect.

GRAY HARBOUR TO PORT GRAPPLER.

January 4.—The fires still burnt in various directions, and trees and shrubs continued to fall under the devastating effects. As we left the anchorage, the ship's departure being timed to allow her to pass through the English Narrows with a slack tide, a breeze fanned the flames of the fires as the ship steamed away, and an enormous cloud of smoke told too plainly of the ill-judged action of having a blaze for fun. An hour's steaming brought us to the Narrows, a difficult piece of navigation, from the fact that it is necessary to make almost a figure of 8 in the passage. For the *Challenger* at slack tide there was no difficulty, but the case is different for a mail steamer 450 feet long. To alter course ten points in a channel 1200 feet wide, with a small islet—Mid-Channel Island—situated in its narrowest part, and a strong current sweeping through—at times six knots—is a delicate operation in such a vessel, and for this reason the Narrows are avoided, and the Pacific mail steamers—after getting two or three vessels near lost—pass through the Straits of Magellan, via Cape Pillar, and then regain the open sea. After clearing these intricate passages we came into broader water. The nearer hills rose perpendicularly out of the waters, clothed almost to their summits with trees, while others more distant were dark and gloomy, their high, jagged peaks covered with glaciers, and many a winter's snow.

As we proceeded farther southward, changes became noticeable in the appearance of the land, which on either side became of a much bolder and more elevated character. The sky had become cloudy and overcast, and the temperature of the air had fallen several degrees, while icy blasts came howling down deep gorges and crevasses, with occasional squalls of rain, giving us warning of what we had to expect on our further progress through these wild and inhospitable regions. On arriving off Saumaurez Island, we stopped

and dredged in 147 fathoms, obtaining a few starfish, some echini, corals, a couple of fish, and some stones. After this we stood across to the mainland, and entered the excellent and well-sheltered harbour of Port Grappler. On anchoring, a small steam-vessel was observed at the head of the harbour, which, when we boarded, was found to be a supposed total wreck. On the boat returning, it was accompanied by a stranger, from whom the following particulars were elicited.

The vessel was named the *Karnack*, belonging to a German company trading between Hamburg and Valparaiso, and had left the latter place about a month before. On her way through the straits (about ten miles to the north) she had struck on a sunken rock, and, although the water gained rapidly, they were enabled to reach this harbour, and get her into shallow water; they then cleared out all they could from her (for high water came up to the main-deck), and encamped on the Middle Island. After a short time they were rescued by the French war-steamer *La Cher*, and taken to Sandy Point. On their way they fell in with a steam-vessel bound to Valparaiso, to which they gave information of the wreck. This caused the ship to call here; and finding matters not so bad as represented, they took possession of the derelict, leaving four men behind them in charge, intending, on their reaching Loto or Valparaiso, to send assistance to save the cargo (which consisted of silver ore, hides, sugar, saltpetre, and nuts), and to get her afloat again—to do which there appeared to be but little difficulty. Those in possession would accept no assistance from us.

Although it rained continuously during our stay, it did not deter our sportsmen landing to explore the surrounding land. After scrambling through thick shrubbery, a flat space of tolerably open ground was reached. Here a few ducks and geese were bagged. The whole country seemed drenched with moisture, which we afterwards found, on proceeding south, was the normal condition of all the land bordering this part of the straits and channel.

PORT GRAPPLER TO TOM BAY.

January 5.—We bade adieu to Port Grappler and our countrymen at daylight, proceeding southward through Wide Channel.

The day at first gave promise of being very fair, and the view of the great masses of rock on either side, the dark frowning headlands, and snowy peaks beyond, was remarkably fine. We stopped for a short time in the channel and dredged, getting a collection of starfish, echini, corals, and sponges; then proceeded on, and anchored

in Tom Bay, quite near the entrance to Conception Channel, on the east coast of Madre Channel.

Tom Bay is simply a nest of islands off the mainland, and would prove a very unsafe anchorage in heavy weather. In the evening several parties landed, but, after a fatiguing scramble through bushes and over boggy ground, very little was obtained. However, sufficient of the vegetation was seen to show that it was very similar to that met with at the other anchorages. The steam pinnace with an exploring party were away reconnoitring, and an hour was spent in endeavouring to procure a "steamer-duck." This curious bird—half penguin, half duck—is incapable of flying, though furnished with wings; but nature has come to its aid and given it the faculty of using its wings as paddles, and these, with the aid of its webbed feet, enable the bird to skim or paddle along the surface of the water at a very great speed far exceeding that of the steam pinnace going ten knots. The steamer-duck is also a famous diver, and with these safeguards, added to a thick plumage, it is most difficult to kill. The old navigators called the bird the Racehorse, and a very appropriate name it is. Although at times there were several near the boat, two guns failed to kill one, and we returned empty-handed. A trap for sea-otters was set on an island, which was evidently one of their breeding-places.

January 6.—Continued and heavy rain fell, and during the early hours of the morning violent gales of wind in squalls swept down the gorges on us, causing the anchor to drag, and necessitating our shifting the ship's position somewhat further away from an "ugly" rock "awash." All the day furious squalls blew through the ravines from the mountains at short intervals until evening, when the wind moderated.

Surveying parties have been away, and more than one expedition of sportsmen—with rod and gun. The ground was found to have a great similarity to Kerguelen—boggy, spongy, and intersected by numerous small lakes. Some club-moss was gathered here, and a few Antarctic birch plants. A fine specimen of steamer-duck in good plumage was shot to-day. In appearance, the plumage of the bird certainly resembles the penguin, but there the similarity ends. In addition to this the result of the day consisted in bagging seven wild geese, three goslings—alive—and a couple of true woodcock.

TOM BAY TO PUERTO BUENO BAY.

January 8.—This morning, as the weather had cleared, and appeared to be promising, we proceeded down Trinidad Channel

where it was proposed to remain a few days to complete a survey of some of the harbours on the south coast. However, we had hardly cleared our late berth when the weather became overcast; rain and a settled haze set in, and we were prevented from carrying out our intended survey, which had to be abandoned, and our course altered; afterwards, with a fair wind, we entered Conception Channel, and proceeded at a good pace. We stopped in Innocent Channel; sounded and dredged in 142 fathoms (green mud), temperature at bottom 47° Fahr.; passed some beautiful and wild scenes, great ravines opening into charming spots, which occasionally were enlivened by the sun peeping out in the calm intervals between the squalls. Our track now led us through Guia Narrows; here we dredged in 50 fathoms, getting a good haul; at 4.30 P.M. we anchored in Puerto Bueno Bay. Two days were spent here, and the weather being moderately fine, this pretty harbour, which well deserves its name, appeared to full advantage. Many charming little islands, covered with trees, are scattered over its waters.

Close along the water's edge is a narrow strip of grass, and immediately behind is a mass of thick vegetation and trees, consisting of winter's bark, evergreen birch, &c.; while beyond, and as far as the eye can reach, are extensive bare hills, with occasional patches of stunted shrubs, and tracts of boggy ground covered with a thick, low vegetation. In the evening the weather was very squally, with thunder and lightning and heavy rain, and all were thankful we were lying in so comfortable a berth instead of being at sea. However, in the intervals many parties started for a run over the country with gun and rod, but the sport was not very encouraging.

PUERTO BUENO BAY TO ISTHMUS BAY.

January 10.—Left the anchorage at an early hour; the rain fell heavily, it was exceedingly cold, and the landscape presented a most wintry appearance; the snowy hills ranging along on each side, and the bare rock looking most desolate and dreary in the surrounding haze, and this was midsummer. Steaming on through Sarmiento Channel, we dredged in 400 fathoms (soft green mud), temperature $46^{\circ} 5'$ Fahr.; we got several specimens of coral, sponges, and fish. On the conclusion of this operation, we proceeded, passing Esperanza, Vancouver's, and Owen's Islands, Staines Peninsula, Carrington Islands, and through the Farquhar Pass into Collingwood Straits; passed Newton and Hunter Islands, and so through Victory Pass, a lovely spot studded with small islands; reached

the Zach Peninsula, and anchored on its western side, in Isthmus Bay, finding it an excellent and well-sheltered spot.

ISTHMUS BAY TO PORT CHURRUCA.

January 11.—Weighing early this morning, we sighted the high mountain of King William IV. Land, and passed through Mayne Channel, which led us into Smyth's Channel. It rained heavily and frequently throughout the day, but in intervals of clear weather it was a fine sight to contemplate the magnificent scenery on the Patagonian and Fuegian shores, the mountains towering up steeply from the water's edge, with their summits in most instances covered with snow. Keeping along the Patagonian side, we passed some striking cliffs, with deep chasms and gorges, down which cascades ran from their snowy heights. We had now reached the east coast of Queen Adelaide's Land. On passing, a splendid view was had of rugged grey mountains and snowy peaks, with glaciers of many miles in length. At noon we stopped off Sholl Bay, the south point of Queen Adelaide's Archipelago; here we trawled, obtaining several interesting specimens. We had now really entered the Straits of Magellan, and some few miles in the distance could be seen Cape Pillar, its western entrance. We steamed across, passing Beaufort Bay and Tamar Island, and at 2.45 P.M. we entered by a narrow passage a very remarkable port—Churruca, surrounded on all sides by high and rugged hills, eventually anchoring in a good landlocked bay. On landing, the woods were found so thick and tangled that it was hardly possible to penetrate into them for any distance; so the sportsmen had to be content at getting a stray shot from the beach, or scrambling over some steep banks close to where some cataracts came rushing down the mountain-sides, from which could be seen masses of ice extending a considerable distance, exhibiting deep longitudinal and transverse crevasses, the fine blue colouring of which formed a great contrast with the dazzling purity of an extensive snow-field.

PORT CHURRUCA TO PORT FAMINE.

January 13.—We spent a second day at Churruca, for an inland excursion which was much enjoyed by the naturalists in search of sport and specimens. The woods were full of botanical interest, ferns in masses, mosses—some very delicate and pretty—beeches, winter's bark, and many beautiful flowering shrubs. A penguin, (*Spheniscus Magellanicus*), the first seen in the straits, was shot in the

water. An osprey and several smaller birds as specimens were obtained, but no game.

This morning, at an early hour, the ship was got under weigh; a little later the full force of a strong gale was felt, and the old ship rolled about merrily. Running under double-reefed topsails with steam, the distance to the next proposed stopping-place, Port Gallant, 90 miles, was soon got over; *en route* we passed one fine glacier reaching to the water's edge, and saw several others on the coast line.

Proceeding, we passed the Cordova Peninsula, and through Crooked and English Reaches; the coast appeared to be high, rugged, and seemingly continuous, but on nearing it was seen to be made up of numbers of small islands, the sea intersecting the land in every direction, and opening into large gulfs and sounds. By noon we were off Fortescue Bay, where it was decided to remain for a short time for dredging. On the somewhat cleared spaces could be seen the fires of the Fuegians, and well can I remember when last here seeing the canoes alongside, with the natives screaming and gesticulating for "tabac." Some of them had small seal-skins over their shoulders, but the greater number, both of men and women, were entirely naked; and, considering the severity of the weather, it seems strange how they exist. Yet with all this there is no reason to believe that these people are decreasing in numbers; therefore we must suppose that they enjoy a sufficient share of happiness, of whatever kind it may be, to make life worth having. Nature, by making habit omnipotent, and its effects hereditary, has fitted the Fuegian to the climate and the production of his miserable country.

Proceeding on our way, at 4 P.M. we were off Cape Froward (the most southern point of South America). Here we encountered some fierce squalls (williwaws) of wind rushing down the gorges and channels. We shortened all sail and steamed on the remainder of the way, until reaching Port Famine, where we stopped for the night. It was here the first penal settlement was established by the Chilean Government in the straits, in 1843. This place expresses by its name the lingering and extreme suffering of several hundreds of Spaniards, who had landed here with a view of establishing a settlement, under the direction of Sarmiento (in 1581), their object being to fortify two positions (one here, the other at Cape Posseasion), in order to prevent the English from passing through. After a short time Sarmiento left for Spain, and on his way there he was taken prisoner by Sir Walter Raleigh, and brought to England, while the unfortunate colonists were left to starve in the

straits. Their fate remained unknown, until Cavendish passed through in 1587, when he found only twenty-four out of the original four hundred colonists. The port was then named Port Famine, in commemoration of the sad fate of its first settlers.

The excellent anchorage and sheltered position were the chief reasons for its being selected by the Chilians for establishing their first colony: but the same ill-luck appears to have attended it; for after struggling on for some years, during which time the colonists were frequently reduced to great distress by the failure of supplies arriving from Chili, it was sacked and burnt down by the convicts, who mutinied and killed all the officials, making good their escape in a small vessel. Eventually, however, they were captured, and met with their deserved punishment.

Our stay was very short here. Still numbers landed as usual in search of sport and specimens; but as so much rain had fallen, the country in all directions was like a great bog. Had several hauls with the trawl in the harbour, getting plentiful supplies of large prawns, starfish, coral, and seaweed.

PORT FAMINE TO SANDY POINT.

January 14.—A charming morning. We left the port, and steaming over a calm sea, and passing the land rapidly, it was near 9 A.M. when the anchor was dropped in the roadstead off Punta Arenas, the site of a small settlement established by the Chilean Government. This colony, the only one in the straits, has a governor and other officials, and some hundred colonists.

I took the opportunity of landing, and had a stroll round the settlement, which consists of a number of wooden buildings, so grouped as to form one long straggling street, running nearly parallel with the beach. From this it is intended that other streets shall branch off, but they are at present only indicated by scattered buildings half a mile apart. A large square, or Plaza, is provided for, on one side of which is the hospital, and on the other side the residence of the British Consul (Mr. Hamilton). At the extreme end of the main street is the residence of the governor, and beyond is a large inclosure containing the barracks, the prison, and the guard-house.

A small river is at hand, and forests where abundant supplies of timber are to be obtained; here also are considerable tracts of open country for cattle-grazing. Before leaving, I visited the coal deposit which has recently been discovered, and for the working of which a company has been formed.

The mine is situated some six miles inland, and is easily reached by a line of railway, over which a locomotive and trucks run frequently during the day. After leaving the cleared space of the settlement, the road lies through a dense forest (just cleared sufficient for traffic), until reaching the bed of a stream which debouches at Sandy Point. After crossing this stream by a light bridge, a ravine is reached, and in the side of a mountain, rising some 300 feet above the level of the sea, the shafts or burrows have been driven, perhaps in some places to a depth of 50 or 60 feet; the seams vary from 4 to 5 feet in thickness, and are deposited between layers of clay and shell, with bands of shale in immediate contact. From what could be seen of them, the specimens presented the appearance of the bituminous fuel known as caking coal. The "out-put" as yet has not been very great, but from the results of some thirty tons tried by us, very fair reports have been made, especially when mixed with Welsh.

Gold is also found here. For its working a company has been started. The results, however, have been small, yet I believe sufficient to give encouragement to go on with it.

As population and colonisation increase, the interior of the country will get opened up, and further discoveries be made, and the accommodation afforded by the Pacific mail steamers calling will, ere long, doubtlessly have a beneficial effect on the prosperity of Punta Arenas.

SANDY POINT TO ELIZABETH ISLAND AND CAPE VIRGIN.

January 18.—For four days we remained in the roadstead off the settlement, enjoying the favourable weather. This morning proceeded on a course, passing thickly-wooded hills, until clear of Cape Negro. The coast consisted of low, undulating plains. The weather being bright and pleasant, a capital view was afforded us of the snow-clad peak of Mount Sarmiento, on the southern part of Tierra del Fuego.

Three hours' run, and the anchor was dropped off Elizabeth Island, so named by Sir Francis Drake, who was here with his squadron in August 1578. From our position it appeared to consist of a range of heights extending in ridges for some eight miles, terminating in a somewhat level plain. Our sportsmen were soon on shore and between thirty and forty wild geese were speedily bagged. The island, which is entirely without trees, but covered with a wiry grass, was likewise well explored. The result was a "kitchen midden," and from it were procured numerous bones of

animals, &c.: this was a chance to aid science that was not to be neglected, so a second day was spent here in digging at the "middens." Two or three flint arrow heads, some bones of the South American ostrich (*Rhea*), of the Guanaco, sea-lions, &c., and some "bolas" stones—the bolas is the throwing ball of the Pampas—rewarded the labours of the party. The fact of no fish-bones being found in the midden would lead to the conclusion that it had been formed prior to the separation of Elizabeth Island from the mainland; none of the bones found declare the place to be of very great antiquity, although the midden is two or three feet below the present surface.

On the morning of the 20th got under weigh with the flood tide, which, with the strong breeze in our favour, took us rapidly through the Narrows, the scenery on either side showing but little variety until sighting the high land near Gregory Bay, which has a very picturesque effect, rising near the shore and running on for some distance, in an easterly direction.

On the Fuegian side, as far as Cape de Espirito Santo, the land was low and uninteresting near the coast, but amidst the haze in the distance, high, bleak, and rugged mountains were observed.

We had now passed the meridian of Cape Horn, and were again in the Atlantic, and notwithstanding the squally and uncertain weather during the past three weeks, we had been enabled to make a great variety of most interesting daily observations in our passage through the straits and channels, and to obtain many valuable results for the benefit of science. A few hours later, and we were clear of the straits, passing Cape Virgin, a long, low, dark cliff sloping down at one end into the sea.



CAPE FROWARD, STRAITS OF MAGELLAN.

CHAPTER XIX.

CAPE VIRGIN TO FALKLAND ISLANDS AND MONTE VIDEO.

Our first haul in the Atlantic—The Jason Islands—Eddystone Rock—Cape Pembroke—Falkland Islands in sight—Enter Port William—Anchor off Stanley—The settlement—Climate—Death of an able seaman by drowning—Leave for Port Louis—Anchor in Berkeley Bay—Funeral of our late shipmate—Return to Stanley—The stream of stones—Leaving the Falklands—Stormy weather—Sounding and trawling—Sight the land off Lobos Island—Pass Maldonado Point—Steaming up the Rio de la Plata—Anchor off Monte Video—The city and suburbs.

CAPE VIRGIN TO FALKLAND ISLANDS.

HAVING a strong and favourable breeze, good progress was made, and before nightfall the coast-line was out of sight. Again we were sounding and trawling, and the first haul in the Atlantic, from a depth of 56 fathoms, produced an immense stock of "*Euryale*

Ascidians"—our quondam progenitors (?), crabs, star-fish, &c.; such result was considered by all as very satisfactory. The weather was bright and clear, with a heavy swell from the southward.

January 22.—This morning, amidst fog and haze, the Jason Islands were reported, a group lying on the north-east side of the West Falklands; and later, the remarkable Eddystone Rock (about 250 feet high), situated off Cape Dolphin, on the north coast of East Falkland, was to be seen. Here we sounded in 110 fathoms, and trawled, but without success. Continuing our course, the next morning the lighthouse on Cape Pembroke was seen. A few hours later we entered Port William, and soon after passed through the Narrows, and had our first sight of the town of Stanley, anchoring within a short distance of the shore. The weather was fine, which caused Stanley to have a pretty appearance from the anchorage, with its white cottages and light farm-houses scattered somewhat irregularly on the slope of a hill, brightening up the otherwise desolate and sterile appearance of the settlement, where not even a single tree exists or a strip of wood grows of sufficient size for the most ordinary purposes. Attempts have been made from time to time to propagate trees, &c., but in all cases they have been attended with entire failure. On landing at the town pier, the first thing to notice is a small obelisk, erected in commemoration of the visit of Prince Alfred, in 1868, when in command of H.M.S. *Galatea*. From here a street so-called leads to the top of the hill, and branching away is Ross Road, which runs along for some two miles, facing the harbour, and in front of all the houses; at its western extremity is Government House, a plain stone building within a fence. At the other extreme is the cemetery. This appears to be the only level walk in the colony. The hills are but very rarely available for a walk, consisting, for the most part, of little else than rock and boggy ground. I cannot call to mind any other settlement (except, perhaps, Tristan d'Acunha) more dismal, miserable, and devoid of all interest, than this at the Falkland Islands. A week of hospitality and gaiety, in which both sides, our own people and the colonists, have vied with each other. Fishing and shooting parties were organised daily, and good sport invariably resulted. The geese were found so tame that we had to give up shooting them, and a boat's stretcher or stick was sufficient to ensure a bag. And the fish caught daily in the trammel are nearly enough to supply the whole crew. This with beef and mutton at threepence the pound makes a land of Goshen for us all. Vegetables, are, however, scarce, and new potatoes will not be ripe for another month. Draught ale and porter at threepence the glass, and good spirits at about English

prices, add to the sense of enjoyment of the ship's company. Until within the last twelve or fifteen years the land of Falkland was nearly all the property either of the Crown or the Falkland Islands Company, and cattle were reared for the sake of their tallow and hides. Since then the suitability of the islands for sheep-farming has been established, and to-day the whole of the land is leased or bought for this purpose; sheep generally taking the place of cattle. Scotch shepherds and Cheviot sheep are found all over the land, and the success attending it causes their owners to be most sanguine. In 1860 the island company did not pay its expenses; it now returns a dividend of as much as 15 per cent., the company alone possessing 100,000 sheep, besides horses and cattle to the extent of 20,000. It has formed a portion of our British Colonial possessions since 1833 when a Lieutenant-governor was first appointed, the seat of government at that time being at Port Louis, but in 1842 it was changed to its present site—Stanley. The sources of revenue are derived from the rental or sale of crown land, spirit licenses, duties on ale and spirits imported, &c. Unfortunately the proceeds from these sources are not sufficient to meet the expenditure, and a yearly deficit is the result. The position these islands occupy in a commercial point of view is of great importance, being placed in the great highway from Australia, and to and from the west coast of America; they are certainly dangerous to approach, yet abound in safe harbours, with facilities for repairs and for obtaining supplies. "Lame ducks" (but since the passing of Mr. Plimsoll's Act they are much rarer now), on their way round Cape Horn, or homeward bound, after a gale of wind, were the "God-send" of Stanley, but of late years, with the better class of vessels employed, very few have had occasion to seek shelter or repairs in this port; these results cause a great depression in the shipping trade.

The climate is considered remarkably healthy. The winters are about as severe as those usually felt in the north of Scotland; the summer months are not so genial, and usually very boisterous.

February 1.—Last evening another of our shipmates was taken from amongst us. Coming off from the shore late at night in the steam pinnace he fell overboard when near the ship, and so thick was the rain, and so fierce the squalls of wind at the time, that the accident was unnoticed by the two men in the bows of the boat. But the splash was heard from the ship, and Lieutenant Carpenter jumped from the gangway and swam to the man's rescue, although pitch dark and both wind and sea bitterly cold. The man had sunk, but most fortunately, Lieutenant Carpenter reached him in time, and managed

to raise his head above water, assisted by some of the pinnace's crew, who held out an oar for him to clutch. Many others were speedily now to the rescue, and both were picked up soon after in a very exhausted state. Poor Bush only breathed for a few moments after he was brought on board, although three surgeons and many willing assistants tried in vain for more than three hours to establish respiration.*

This morning the vessel steamed round to Berkeley Sound and anchored off Port Louis, the site of the original French settlement. The Port contains one house, a substantial stone building, erected as a barrack by the Royal Engineer Corps some years ago. Captain Ross visited here in 1842, and took a series of magnetic observations at this place, and our staff are at work to-day on the same spot. At the same time the mean height of the tide as shown by Ross's marks is being verified.†

February 3.—Yesterday was a stormy and rainy morning, very dismal and dreary; poor Bush, the able seaman drowned a couple of days since, was buried in a little enclosure on an exposed swampy moorland—not alone, for two or three head-boards indicate that other wanderers have found rest here. His remains are lying near those of Mr. Matthew Brisbane, the Governor of Port Louis about 1842, and the victim of a plot on the part of some Spanish gauchos or herdsmen, who intended to murder all the colonists. The governor was one of the first killed. He was an old antarctic cruiser and had been, so says his grave-board, as far south as 74° in command of a cutter in company with Captain Weddell.

In the afternoon the weather cleared and advantage was taken of a glimpse of sunshine to get ashore, but the brightness was only of short duration, and the following day was equally unfavourable, still it did not deter a large party starting for the rabbit-warren, distant five miles over swamp and bog; they reached their destination without mishap, and brought back between twenty and thirty rabbits, a dozen wild ducks and teal, and fifty geese.

The next day it was a little brighter; but there is little of interest here, except, perhaps, to the geologist, whose attention is sure to be attracted by the extraordinary stream of stones, which is so difficult to account for. They are formed of great numbers of fragments of quartz, spread out in rows, from half a mile to one mile in width and two or three in length, extending along valleys and to the tops of some of the highest hills, from which they appear to have descended.

* Lieutenant Alfred Carpenter, on reaching England, was presented with the Albert medal and the Royal Humane Society's medal for this gallant act.

† On its completion, a tablet was left with the results.

We had now been here some fourteen days, and during that time had imparted a little gaiety to the colonists with dances and dinner-parties.

FAULKLAND ISLANDS TO MONTE VIDEO.

February 6.—Rain, or wind, or both combined, seem to constitute the normal state of things in these bleak and desolate islands; although during our stay we had two or three fine days, yet all were glad when it was decided to proceed on our way north, the weather promising to be very squally, and soon after clearing Cape Pembroke there was every indication of a rough passage before us. Three reefs were taken in topsails, and all made snug for the night, during which but little progress was made. The next day for a time we had clear blue sky; still there was a rough and heavy sea. Pictures from a sailor's note-book in these wild and stormy latitudes rarely contain any sketches of blue sky or smooth water, but are more frequently descriptive (as we now found it) of fierce and stormy waves and howling winds; however, the wind being from the south-west, it was in our favour, and each day brought us nearer our destination. On four occasions we stopped for soundings and trawlings, getting depths of from 1035 to 2425 fathoms.

February 11.—There has been rejoicing amongst the men of science to-day under the following circumstances:—

On our outward passage, when near the equator, a sounding made on August 31, 1873, showed a stratum of cold water of a temperature 32.4° . Now if the theory of oceanic circulation from the poles to the equator be correct, it follows that colder water existed somewhere near the Antarctic pole, as it would naturally receive some heat in its passage to warmer latitudes. No such colder water has been met with until to-day, when we entered a stream of water of a temperature of 35.6° at 125 fathoms, 33.8° at 1500 fathoms, 31.4° from thence to the bottom, a depth from the surface of 2040 fathoms.

Here, then, the problem has been solved, and the correctness of the theory verified. The results from our dredging to the natural history collection, however, were but scanty.

As we neared the coast of South America, the weather was much finer, and on the 14th we dredged in 600 fathoms, from a rock bottom, and got numerous specimens, but nothing new.

February 15.—This morning, in the haze, we had a glimpse of the low land lying to the south of Maldonado Point. We now entered the River La Plata, or Plate, as it is commonly termed by sailors. Steaming on over a calm sea for some eighty miles, at 4.30 P.M. the fine panorama of Monte Video and its suburbs, with the harbour

full of shipping, was in view, and here we anchored, some two miles off the shore. From what could be seen of the city, it appeared a charming place, full of bright-looking, handsome edifices, built on the side of a hill. Here were H.M. gun-vessels *Cracker* and *Ready*, and representative men-of-war steam-vessels, flying the national colours of France, Germany, Italy, Spain, Brazil, and Uruguay, with great numbers of merchant-vessels of different nations.

The River La Plata owes its name to the Spaniards, who transferred the produce of the silver mines of Chili and Peru, on its waters to the ocean, and thence to Europe. The gold and silver was brought from those provinces across the Andes, to Buenos Ayres, from whence it was shipped; but the extension of discovery no sooner opened the passage round Cape Horn than this river lost its original importance. In point of magnitude it is the third river of the New World. At its mouth it is 100 miles wide, and off Monte Video it is 50. The banks for some hundreds of miles are the terminations of vast plains, on which there is little visible to cheer or enliven the scene, and nothing to break the solitude, save extensive and numerous herds of cattle.

Twelve hours' run up by steamer and Buenos Ayres is reached, a fine large city, where many things of interest are to be seen. The city of Monte Video stands on a strip of land, which forms the eastern side of a small bay, on the north bank of the river, but with our draught was not approachable within two miles from the shallowness of the water: what could be seen of the city from that distance was something pleasing; the towers and domes of the cathedral, churches, and public buildings, probably appeared all the more charming and picturesque coming as we did from such a miserable place as the Falklands. On landing, I found a fine city with many large buildings, and signs of prosperity. I say signs, for the wretched fratricidal fighting which has lasted for fifty years, cannot fail to impoverish the country. To gain power is the aim of the chiefs. To be allowed to loot and swagger about, well fed and paid, is the desire of the soldiery, who here indeed are omnipotent. Political honesty, if the word honesty be known at all, which I doubt, is absent from the vocabulary of the Uruguay Government, and of late requisitions and squeezes made in the name of either of the contending parties, have been so frequent and severe that the English Estancieros or sheep-farmers, have left the country *en masse*. Without a coinage, with its paper money depreciated to one-fourth its value for Government payment, and absolutely worthless in commercial transactions, a heavy foreign debt and reduced trade, the "Banda Oriental" is in a bad state. The city is laid out in regular Spanish style, so prevalent in South

America, that is, in rectangular blocks. The streets are wide and clean, intersecting each other at right angles. There is a large proportion of good dwelling-houses and shops, abounding in every necessary and luxury. The Cathedral Square, with its charming gardens and pleasant walks, where the military bands play every evening, forms the principal promenade, and makes it a cheerful and agreeable resort of the wealthy residents. From here the road leads to a long straight street, with lofty buildings and extensive premises filled with merchandise; trees are planted on each side, and at the extreme end is a tall column, bearing on its summit a bronze statue of Liberty. An English Club in the square opened its doors to us during our stay, and a capital place of resort it proved to be. Here even peace is not always procurable; the marble staircase is indented and chipped with bullet-marks, and it is only a short time since seven men were killed or wounded on the stairs, during one of these frequent disturbances; and even whilst we were at Monte Video, the resignation of two of the ministry alone prevented a riot, during which time the troops were kept in a state of readiness for action at any moment amongst the populace.

Tram-cars run through the principal thoroughfares, to the many suburbs of the town; and a railway under English management is in working order for about one hundred miles into the interior. The inhabitants swarm in the thoroughfares, where are incessant throngs of vendors, purchasers, and idlers, intermingled with every variety of conveyance; while the ear is stunned by the shrill conflicting cry of the ambulatory dealer of every conceivable commodity. Pleasure-gardens are close at hand, besides theatres, operas, circus, and other places of amusement suited to the seasons. Bull-fights were being carried on, and many from the ship visited the exciting but cruel pastime.



THE CITY OF MONTE VIDEO, LOOKING TOWARDS THE HARBOUR.

CHAPTER XX.

MONTE VIDEO TO ASCENSION AND THE CAPE DE VERDE ISLANDS.

Leave Monte Video—Swinging ship—Sounding and dredging in the River
 La Plata—A Pampara off the coast—Enter the cold current—Its course
 —Completion of the voyage round the world—What has been accomplished—Course shaped for Ascension—South-east trades—Arrive at Ascension—The garrison—George Town—Scenery—The Green Mountain—Ascension turtle—Leave Ascension—Sounding—Cross the Equator for the sixth time—The oppressive region of equatorial calms—Steaming through the Tropics—Sight the Cape de Verde Islands—Arrival at Santiago—Anchor off Porto Praya—Leave for St. Vincent—Anchor in Porto Grande—Strong trade-winds.

February 25.—We had now been ten days at Monte Video, during the greater part of which the weather had been exceedingly unpleasant; strong northerly winds and heavy seas made it both disagreeable and difficult to land, lying, as we did, fully two miles from the

shore. It happened however to be a fine day on leaving, and a few hours were devoted to swinging ship for magnetic corrections and deviations. We then proceeded under steam out of the River La Plata. When off Maldonado Bay, we sounded and dredged in 13 fathoms, getting a good haul of fish, shrimps, holothuria, and dead shell.

On clearing the land, the barometer gave indications of a coming change in the weather, and, ere long, the wind freshened and rain fell in torrents. It soon became evident we were in for one of the Pamparas, for which the Plata and its vicinity have been long celebrated, and which owe their name to the circumstance of their blowing from off the Pampas or plains.

All due preparations were made by shortening sail, and as the wind increased, it found us well prepared. Fortunately it did not last long, and the next day (Feb. 28) we were able to recommence sounding. Found bottom at 1900 fathoms; temperature 32.7° Fahr., showing that we had again fallen in with the cold Antarctic current. During the following nine days, daily soundings were obtained from an average depth of 2700 fathoms, showing the same temperature results (for 400 fathoms from the bottom it was below 32° Fahr.) On the 9th March the depth was found to be 1715 fathoms, temperature having risen to 34° , showing the limit of the cold current in an easterly direction; this was about 900 miles from the first sounding. The current now appeared to turn north, and after crossing the equator in the vicinity of St. Paul's Rocks, to take a course again to the eastward, and so strike down the western coast of Africa; for on the 27th Oct. 1873, when 130 miles from the Cape of Good Hope, a cold under-current (temperature 32.9°) was found at a depth of 2325 fathoms, which, in all probability, was a branch of this now met with. On March the 10th the depth was found to have increased to 2200 fathoms; temperature 34° . We trawled and obtained serial temperatures during the two following days. The weather continued very miserable—heavy rain and calms; so the progress towards Tristan d'Acunha was very slow.

The 13th March possessed an interest of its own for those on board, as on that day we crossed the course which had been followed some two years and a half before in the passage from Bahia to the Cape of Good Hope. Thus the actual circumnavigation of the world had been successfully completed, and at least the greater portion of the cruise happily achieved. Since leaving this position, latitude $35^{\circ} 41'$ south, longitude $20^{\circ} 55'$ west, the vessel had sailed over about 44,000 miles. Some two hundred soundings, and nearly as many successful dredgings, had been taken in all the great oceans and

channels of importance in our track, in depths averaging from 1000 to 4000 fathoms. The soundings and temperatures have supplied the material information, by which oceanic sections have been constructed, showing formation of the bottom, the depth, variation in the temperatures, the currents, and specific gravity, &c., in all the great seas sailed over.

This, together with the abundance of material collected in the department of natural history and other scientific branches, will make this voyage one of the most important that has ever taken place.

On March 14th, in latitude $35^{\circ} 45'$ south, we trawled in 1400 fathoms. Amongst the specimens obtained, it proved that life at the bottom has, as its prototype, that found at the surface, for on studying two of the last specimens brought under our notice, one a *Holothuria*, which has a couple of parasite shells embedded in its body, and another, a *sea urchin*, was seen as carefully engaged nursing and keeping in security its young ones on its back as any animal known on the earth's surface. Being about 300 miles from Tristan d'Acunha course was altered, and we stood north for Ascension Island, distant 1700 miles. Having a favourable breeze, we daily made good progress. On March 18th we sounded in 1890 fathoms, temperature $36^{\circ} 8'$, and reached the south-east trades, which blew with unbroken regularity, not even forsaking us as we occasionally stopped to sound and trawl. However, as we ran farther north, the breeze got lighter, and each day saw the barometer rising, and clear, bright weather greeted us as we entered and passed through the tropical regions. We sounded every 200 miles on the course, the depths varying from 2900 to 1400 fathoms.

On March 27th the solitary island of Ascension was in sight, rising alone in the midst of the vast Atlantic. When about eight miles distant, we sounded and dredged in 429 fathoms, getting a good supply of mud, echini, and coral. The place is notorious for the absence of rain, and we were surprised at encountering a heavy tropical downpour lasting for some hours.

On anchoring in the afternoon off the south or lee side of the island, the results of the unusual visitation were soon made known by the complaint of our visitors who described that roads had been washed away, houses half demolished, and the usual accompaniments of a flood had seriously damaged their stores. Still they had reasons to be glad, for previous to this water had become so scarce on the island that the inhabitants were on an allowance of three gallons each per day.

Ascension, although discovered as early as 1501 by the Portuguese, yet remained uninhabited until 1815, when the English took

possession of it, and from that date to the present have maintained a small establishment and depôt for stores required by the vessels employed on the West African Station. It is only about nine miles in length from east to west, and five or six from north to south, the area being about 35 square miles.

The surface of the land consists of ridges of naked rock, hills of clinkers and cinders, and plains of ashes, dust, and lava. Just abreast of the anchorage is a somewhat level, cleared space, where are situated the buildings used as stores and workshops, a small fort, a pretty little church, and the hospitals. Barracks and scattered residences of the naval officials complete the group. It is in charge of the board of Admiralty, by whom a naval captain is appointed as Governor, whose rule is as absolute as if on board a man-of-war.

At the time of our visit everything possible was being done by Captain J. W. East to make life endurable to those under his command amongst this hot mass of clinkers, with the happiest results.

There are rumours current that the naval establishment will shortly be considerably reduced, if not given up altogether. For the sake of those who have from time to time to pass a portion of their life here, this is to be wished. Still on the other hand there seem many reasons for retaining this excellent sanitorium and so favourable a depôt centre. In case of war the island would require protection from the fleet, as it is not fortified in the modern sense of the term, but the advantages of its position are great, unless indeed St. Helena is to take its place. With the exception of the one green mountain-top there is no vegetation, no shelter, no tree, to be seen—in fact nothing to make life pleasant or endurable here; whilst St. Helena is a comely spot to look on, and is well protected, besides being an integral part of the British Empire, whereas Ascension by some peculiar constitution is *de facto*, if not *de jure*, a man-of-war with no civil element whatever.

The hills of Ascension are numerous; the most elevated rejoices in the name of the Green Mountain, from the light hue of the verdure at its summit, where there are excellent gardens, producing many varieties of vegetables and fruits. It is situated nearly in the centre of the island, and is about 2800 feet high, rising amidst waste and desolation; for around is to be found neither verdure, shade, nor shelter, but one entire field of lava. Over this rough material a road has been made for the six miles leading to the summit. The lofty ridge of this mountain arrests the watery vapours that would pass it, and supplies the settlement with water. Numerous tanks on its side are so situated as to secure every drop of that most essential element. When about 2250 feet up, the Mountain House is reached, where

refreshments are to be obtained, and quite near at hand are the Convalescent Hospital and numerous cottage residences, from which capital views of the island are to be obtained. In various directions are seen craters of extinct volcanoes, varying from 100 to 300 and 400 feet in height. One of these, more terrific and rugged than the rest in appearance, is named the Devil's Riding Ground; it is an elevated mound about half a mile in circumference, with a road winding round it reaching to the top, closed in at the sides by a ridge of lava; and quite near at hand is "Wide-awake Fair," a rough stony plateau, where thousands of sea-birds land for breeding during the season.

On the whole, the climate of Ascension may be regarded as very healthy, as it is situated in the direct track of the south-east trade-wind, having a particularly dry soil—nothing like swamp or marsh; and from the absence of all vegetation there is nothing to taint the air or to produce impurity.

Fever has occasionally been imported here from the pestiferous coast of Africa, but even that now appears to be a thing of the past. The coast being comparatively healthy, and the vessels not being kept so long on the station, we rarely hear of those dreadful epidemics which formerly made such havoc.

Ascension is famed for its excellent turtle, at one time considered the support of the island, the flesh being termed island beef. Large ponds are constructed for keeping the fish.

During the season, from December to June, men are employed along the sandy beach watching for the full-grown females to land for the purpose of laying their eggs. They crawl up the sandy beaches, and make a large hole by scooping the sand up with their flippers; having deposited their eggs in it, and carefully filled in the hole again, they prepare for their retreat to the water, but are intercepted by the watchers, who speedily turn them on their backs. At daylight they are taken to the inclosed ponds. Some of those captured weigh as much as seven cwt. They lay from seventy to eighty eggs at a time, and repeat this operation two or three times in a season. The eggs are an inch and a half in diameter, and covered with a soft semi-calcareous shell.

Opportunities were taken during our stay by the scientific staff to investigate the peculiarities of the soil, and to study and illustrate in a complete manner the development of the turtle in all its stages; thus a week was spent very pleasantly, Captain East, and the officers of the island under his command doing their utmost to make our stay amongst them agreeable. However, after completing with stores, there was nothing further to detain us; so on the morning

of April 3rd we proceeded on our voyage, and, when in the offing remained a few hours, swinging ship, both for azimuth and magnetic corrections. On its conclusion a course was shaped north for the Cape de Verde Islands, distant some 1800 miles.

Sounding and trawling were frequent on our course over an average depth of 2000 fathoms; crossing the equator on the 7th April, for the sixth time. Previous to this, in latitude $4^{\circ} 10'$ south, we lost the south-east trade-wind, and for more than a week afterwards we were steaming through a tedious and depressing region of calms and squalls of rain off the African coast. Its effect on the health and spirits of us all was most enervating; the oppressive and damp heat made it one of the most unpleasant parts of the cruise; calms and head-winds accompanied us each day. At length the island of Santiago was in sight, and early on the morning of the 16th April we anchored off the town of Praya. From what could be seen from the vessel, it is altered but little in appearance since last we were here (August 1873).

After obtaining a few fresh supplies, we left the same evening for St. Vincent, which was sighted the next morning, and later in the day anchored off Porto Grande. Here a week was spent, completing stores and filling up with coal. A busy shipping-trade appears to be carried on; for numbers of mail steamers and traders make this a port of call for filling with coal, before shaping course to distant lands. The harbour is safe and convenient, but the scattered houses comprising the town, backed up with high volcanic rock, are dismal and uninteresting.

CHAPTER XXI.

HOMEWARD BOUND.

Leave St. Vincent—Head-winds and disagreeable weather—Sight the coast of Spain—Anchor in Vigo Bay—The city—Channel fleet—Leave for England—Off Cape Finisterre—Favourable run across the Bay of Biscay—The English Channel—The coast of England—Anchor at Spithead (Portsmouth)—Arrival at Sheerness—Retrospect—Pay off at Chatham—Parting—At home—The end.

On the 26th April we left under sail, homeward bound. When well clear from the land, we picked up the trades, and ran on merrily through the Tropics towards the Azores, full of the hope of speedily seeing the coast of England. But we were too sanguine; for soon after, meeting with strong and adverse winds, our coal was consumed, and we were compelled eventually to run into Vigo for a fresh supply. The coast of Spain was sighted on the morning of the 20th May, and soon after we had exchanged the rolling, turbulent sea for the quiet and placid waters of the Bay of Vigo, which sweeps inland for more than 20 miles. We anchored off the prettily situated town, which is built on the side of a hill overlooking the broad expanse of water, where at the time of our visit some half-dozen ironclads belonging to the Channel squadron were at anchor, forming the centre of a scene Oriental in its wealth of palms, orange groves, flowers, and orchards. Just time enough was allowed for a scamper on shore, through the narrow, steep, and winding streets of the town, and only a glimpse could be had of its old walls and gates, its churches and quaint-looking houses, of all shapes, sizes, and colours, in white, red, or green, according to the taste of the owners. All this, with a charming bright and sunny sky, and the pretty and picturesque dress of the peasants, made up a picture delightful to the artist as well as the ordinary observer.

By midnight sufficient coal had been taken in, and early the next day we were again at sea. The weather was still squally and unpleasant, yet we managed to get round Cape Finisterre; and now, with the wind somewhat fairer, a capital run was made across the dreaded Bay of Biscay. The evening of the 23rd, the bright light

on Cape Ushant was seen ; and the next morning, amidst haze and fog, we had our first sight of the English coast, as we passed up Channel, amidst a very maze of shipping outward and homeward bound.

Onward we go, sighting the old familiar headland and landmarks—the Eddystone, the Start, the white cliffs at Portland and St. Alban's Head—until at last the Needles are in sight. After a few hours' steaming through the Solent, we reach Spithead (Portsmouth); and late on the evening of the 24th May we anchor in English waters, after an absence of three years and a half.

A few days more, and we are at Sheerness and Chatham, amidst all the bustle and excitement attendant on returning stores and paying off.

Thus the cruise has been successfully accomplished, and the intentions of the expedition happily achieved. That it will exalt our national reputation to a very considerable extent, in one of the most popular branches of the service, cannot for a moment be doubted.* The completion of surveys ; the success of soundings ; configuration of the depths of the great ocean, with its nature and temperatures, and the composition of its bottom, have all been investigated and carried out by the hydrographic staff ; and Professor Thompson and his talented assistants may well be complimented on their labours, which have contributed such an abundance of material to the various departments of natural history and the other scientific branches under their direction.

By-and-by, when all these subjects shall have been investigated, and opinions formed from the numerous and valuable collections sent home from time to time, then—and only then—will a true idea be obtained of the activity and research of each member of the expedition during the course of the voyage.

Doubtless we shall be told of wondrous facts which will read like fairy tales ; for previously no sounding-line had ever traversed the great oceans, or mapped out their figure. We now know that there are laws which govern the geographical distribution of marine plants and animals, as well as those we are familiar with on the earth's surface : of the myriads of curious creatures, organised with delicacy and beauty, existing in these previously unsounded depths ; creatures with numberless eyes, and others without any ; starfish, growing on long and slender stalks ; of beautiful phosphorescent avenues of

* The Geographical Congress held at Paris, August 1875, awarded to the members of the *Challenger* Expedition a first-class medal as a token of admiration for the work done by them in the cause of science.

vegetation ; fish of all hues, blue or gold, striped and banded, in all colours and sizes, from the tiniest infusoria to the huge whale.

It is impossible at present to foresee or estimate the vast amount of information that will result from this the greatest scientific expedition that ever sailed from any shore.

The last day has come (June 12th), when all these close associations will be severed ; and each one of the *Challenger's* crew goes his own way, to seek relaxation and pleasure amongst home scenes and friends near and dear to him.

A last shake of the hand, with " Good luck and good-bye !" and so now, to you, my reader I say farewell.

APPENDIX.

ABSTRACT OF THE VOYAGE OF H.M.S. CHALLENGER, DECEMBER 1872 TO JUNE 1876.

From	To	Date		Distances made good.	Coals expended.	Number of Days at Sea.	Number of Deep Sea Soundings obtained.	Number of Serial Temperatures.	Number of Success- ful Trawlings.	Number of Success- ful Predragings.	Number of Success- ful Trawlings.
		Sailing.	Arrival.								
Sheerness.	Portsmouth	1872 Saturday, Dec. 7	1872 Wednesday, Dec. 11	200	Tons cwt. 87 14	5	..	..	..	..	..
Portsmouth	Lisbon	Saturday, Dec. 21	Friday, Jan. 3	1,091	207 54	13	4	..	1	..	..
Lisbon	Gibraltar	1873 Sunday, Jan. 12	Saturday, Jan. 18	340	68 134	7	10	..	3	1	1
Gibraltar	Madeira	Sunday, Jan. 26	Monday, Feb. 3	655	100 04	9	12	..	3	..	..
Madeira	Teneriffe	Wednesday, Feb. 5	Friday, Feb. 7	255	15 94	2	1	..	..	..	..
Teneriffe	St. Thomas	(Off Teneriffe) Friday, Feb. 14	Sunday, March 16	230	45 54	4	11	2	2	..	..
St. Thomas	Bermuda	Monday, March 24	Friday, April 4	2,879	122 18	30	24	13	11	2	2
Bermuda	Halifax	Monday, April 21	Friday, May 9	1,261	79 184	11	10	5	6	..	..
Halifax	Bermuda	Monday, May 19	Saturday, May 31	796	127 94	18	14	7	9	..	..
Bermuda	St. Michael's	Friday, June 13	Friday, July 4	2,031	158 194	12	11	8	7	2	2
St. Michael's	Madeira	Wednesday, July 9	Wednesday, July 16	528	109 134	21	18	13	4	6	6
Madeira	St. Vincent	Thursday, July 17	Friday, July 27	1,066	34 104	7	6	4	3	..	..
St. Vincent	Porto Praya	Tuesday, Aug. 5	Thursday, Aug. 7	1,170	46 14	10	11	7	3	1	1
Porto Praya	St. Paul's Rock	Saturday, Aug. 9	Wednesday, Aug. 27	1,955	12 154	2	1	..	..	..	..
St. Paul's Rock	Fernando No-	Friday, Aug. 29	Monday, Sept. 1	342	101 10	18	12	12	1	4	4
Fernando No-	Bahia	Wednesday, Sept. 3	Sunday, Sept. 14	815	18 13	3	5	2	..	..	..
Bahia	(Cape of Good)	Thursday, Sept. 25	Tuesday, Oct. 28	3,883	87 5	11	17	2	2	7	7
	{ Hope . . . }			19,367	173 154	33	13	10	9	2	2
Total of first section of voyage				19,367	1,597 6	216	180	85	91	28	28

ABSTRACT OF THE VOYAGE OF H.M.S. CHALLENGER—continued.

From	To	Date of		Distances made good.	Coals expended.	Number of Days at Sea.	Number of Deep Sea Soundings obtained.	Number of Serial Temperatures.	Number of Successful Dredgings.	Number of Successful Trawlings.
		Sailing.	Arrival.							
Cape of Hope	Melbourne	1873 Wednesday, Dec. 17	1874 Tuesday, March 17	7,637	Tons cwt. 247 16	91	15	13	11	6
Melbourne	Sydney	1874 Wednesday, April 1	Monday, April 6	550	58 184	5	1	1	4	3
Sydney	Wellington	Monday, June 8	Sunday, June 28	1,432	177 18	20	11	6	1	5
Wellington	Tongatabu	Tuesday, July 7	Sunday, July 19	1,547	73 8	13	6	4	2	1
Tongatabu	Ngola Bay	Wednesday, July 22	Saturday, July 25	400	13 8	3	..	..	..	..
Ngola Bay	Levuka	Monday, July 27	Tuesday, July 28	120	7 04	1	1	1	3	..
Levuka	Ngola Bay	Saturday, Aug. 1	Monday, Aug. 3	120	33 14	2	1	1	..	..
Ngola Bay	Port Albany	Monday, Aug. 10	Tuesday, Sept. 1	2,250	71 61	22	9	8	5	3
Port Albany	Dobbo	Tuesday, Sept. 8	Wednesday, Sept. 16	658	24 6	8	..	2	..	..
Dobbo	Kil Donlan	Wednesday, Sept. 23	Thursday, Sept. 24	100	17 94	1	2	1	..	..
Kil Donlan	Banda	Saturday, Sept. 26	Sunday, Sept. 29	200	38 4	3	1	1	..	..
Banda	Amboyna	Friday, Oct. 2	Sunday, Oct. 4	115	17 104	2	2	2	..	..
Amboyna	Ternate	Saturday, Oct. 10	Wednesday, Oct. 14	300	30 24	4	2	2	..	..
Ternate	Sambouangan	Saturday, Oct. 17	Friday, Oct. 23	511	48 104	6	2	1	2	1
Sambouangan	Iloilo	Monday, Oct. 28	Wednesday, Oct. 28	220	23 124	2	1	1	..	..
Iloilo	Manilla	Sunday, Oct. 31	Wednesday, Nov. 4	350	38 04	4	..	..	..	..
Manilla	Hong Kong	Wednesday, Nov. 11	Monday, Nov. 16	680	24 5	5	1	1	..	..
Total of second section of voyage				17,153	943 184	192	52	41	37	36

ABSTRACT OF THE VOYAGE OF H.M.S. CHALLENGER—continued.

From	To	Date of		Distances made good.	Coals expended.	Number of Days at Sea.	Number of Deep Sea Soundings obtained.	Number of Serial Temperatures.	Number of Successful Dredgings.	Number of Successful Trawlings.
		Sailing.	Arrival.							
Hong Kong	Manilla	1875 Wednesday, Jan. 6	1875 Monday, Jan. 11	650	Tons cwt. 35 17	5	1	1	..	..
Manilla	Zebu	Thursday, Jan. 14	Monday, Jan. 18	380	45 14½	4	1	1	..	..
Zebu	Camiguin Island.	Sunday, Jan. 20	Tuesday, Jan. 26	110	..	2	1	1	1	1
Camiguin Island.	Samboangan	Tuesday, Jan. 26	Friday, Jan. 29	250	..	3	1	1	..	..
Samboanga	Humboldt Bay	Friday, Feb. 5	Tuesday, Feb. 23	1,333	108 18½	18	6	5	..	..
Humboldt Bay	Admiralty Is-lands	Wednesday, Feb. 24	Wednesday, March 3	403	42 2	7	1	1	..	..
Admiralty Is-lands	Yokohama	Wednesday, March 10	Sunday, April 11	2,533	106 0½	32	13	12	2	3
Yokohama	Kobe	Tuesday, May 11	Saturday, May 11	350	72 19½	4	1	1	1	1
Kobe	Miyana	Tuesday, May 25	Wednesday, May 26	120	20 8½	1	..	..	..	..
Miyana	Kobe	Friday, May 28	Saturday, May 29	120	19 5	1	..	..	..	..
Kobe	Yokohama	Wednesday, June 2	Saturday, June 5	400	80 13	3	4	3	2	2
Yokohama	Honolulu	Wednesday, June 16	Saturday, July 27	4,302	279 3	42	24	24	2	7
Honolulu	Hilo	Wednesday, Aug. 1	Tuesday, Aug. 4	200	60 4	3	1	1	..	..
Hilo	Tabiti	Wednesday, Aug. 19	Saturday, Sept. 18	2,430	189 9	30	17	17	1	..
Tabiti	Juan Fernandez	Thursday, Oct. 3	Saturday, Nov. 13	4,643	223 19	41	22	19	..	11
Juan Fernandez	Valparaiso	Monday, Nov. 15	Friday, Nov. 19	400	17 3	4	1	1	..	..
Total of third section of voyage				18,324	1,325 13½	200	94	94	7	45

ABSTRACT OF THE VOYAGE OF H.M.S. CHALLENGER—continued.

From	To	Date of		Distances made good.	Coals expended.	Number of Days at Sea.	Number of Soundings obtained.	Number of Surface Temperatures.	Number of Success- ful Dredgings.	Number of Success- ful Trawlings.
		Sailing.	Arrival.							
Valparaiso	Port Oway	1875 Saturday, Dec. 11	1875 Friday, Dec. 31	2,033	Tons cwt. 76 6	D. hours. 21 0	4	5	1	4
Port Oway	Hale Cove	1876 Saturday, Jan. 1	1876 Saturday, Jan. 1		9 34	0 14	1	1	1	1
Hale Cove	Gray Harbour	Sunday, Jan. 2	Sunday, Jan. 2		7 154	0 134	1	1	1	1
Gray Harbour	Port Grappler	Tuesday, Jan. 4	Tuesday, Jan. 4		6 184	0 7	1	1	1	1
Port Grappler	Tom Bay	Wednesday, Jan. 5	Wednesday, Jan. 5		9 134	0 124	1	1	1	1
Tom Bay	Puerto Bueno	Saturday, Jan. 8	Saturday, Jan. 8		10 84	0 114	1	1	1	1
Puerto Bueno	Isthmus Bay	Sunday, Jan. 10	Sunday, Jan. 10	700	13 104	0 124	1	1	1	1
Isthmus Bay	Port Churruca	Tuesday, Jan. 11	Tuesday, Jan. 11		10 54	0 10	1	1	1	1
Port Churruca	Port Famline	Thursday, Jan. 13	Thursday, Jan. 13		14 34	0 134	1	1	1	1
Port Famline	Sandy Point	Friday, Jan. 14	Friday, Jan. 14		5 24	0 4	1	1	1	1
Sandy Point	Elizabeth Island	Tuesday, Jan. 18	Tuesday, Jan. 18		6 44	0 34	1	1	1	1
Elizabeth Island	Falkland Islands	Thursday, Jan. 20	Thursday, Jan. 22	400	52 11	3 0	3	1	1	3
Falkland Islands	Monte Video	Friday, Feb. 6	Tuesday, Feb. 15	1,173	80 15	9 0	4	4	3	2
Monte Video	Ascension Island	Sunday, Feb. 25	Monday, March 27	3,729	177 134	31 0	21	20	3	4
Ascension Island	Porto Praya	Monday, April 3	Monday, April 17	1,620	187 474	14 0	3	8	2	1
Porto Praya	Porto Grande	Monday, April 17	Tuesday, April 18	1,800	23 18	1 0	1	1	1	1
Porto Grande	Vigo	Wednesday, April 26	Saturday, May 20	2,926	141 10	24 0	2	2	1	1
Vigo	Portsmouth	Sunday, May 21	Wednesday, May 24	630	122 1	3 0	1	1	1	1
Portsmouth	Sheerness	Thursday, May 25	Friday, May 26	150	30 18	1 0	1	1	1	1
Total of fourth section of voyage							43	41	6	20
Total of first section of voyage							180	85	61	28
" second							17,158	943 184	192 0	52
" third							18,824	1,325 124	200 0	94
" fourth							13,541	959 16	111 04	48
Grand total							4,826 13	719 04	374	111
							255	111	129	

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